

# SNP detection using the Invader™ assay in a biplex format

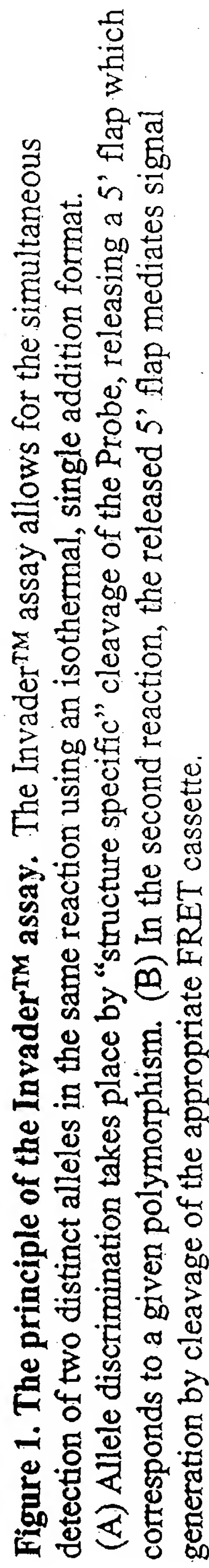


FIGURE 2

## Automated primer selection for multiplex PCR using *Invader™ Creator Primer Designer v 1.3.3*

Multiplex PCR commonly requires extensive optimization to avoid biased amplification of select amplicons and the amplification of spurious products resulting from the formation of primer-dimers. In order to avoid these problems, we have designed *Invader™ Creator Primer Designer v1.3.3* software for the automated selection of multiplex primers. Beginning with a set of user defined sequences and corresponding SNP locations, *Invader™ Creator Primer Designer* defines an “Invader™ footprint” (the minimal amplicon required for Invader™ detection) for each sequence. Primers are designed outward from the “Invader™ footprint” and evaluated against several criteria, including the potential for primer-dimer formation with previously designed primers in the current multiplexing set. *Invader™ Creator Primer Designer* continues through multiple iterations of the same set of sequences until primers against all sequences in the current multiplexing set can be designed.

### 2A.

29043, FM01, aagttagaagaaccaagactatcttggtcaggggtgtatcttgagagtggcagacttttcagtgcct  
ttccattcatgacacttcttgaatctctggcagaaccagccagccgtgttcacagtgtcaaataagggatgtcttt  
gattgcttccaggtgttcttcagcaccaccggagggggatgggtgatcagccgaatctttgactcgggctacccatg  
ggacatggtgttcatgacacgctttcagaacatgttgagaaattccctcccaac [ct] ccaattgtgacttggttga  
tggagcgaaagataaacaactggctcaatcatgcaaattacggcttaataccagaagacaggtaaatataatgtgac  
tgccaagggcttttaggaagaaggagcctctgcctgtccagcagcctatacaagccaggcagtagcacagcaacatg  
gctgaatgtgtgggaacacttgatacaaatttgcttgataataacagctaactgttcttaagtactcagaaagtga  
attatgtatttc

### 2B.

29043, FM01, aagttagaagaaccaagactatcttggtcaggggtgtatcttgagagtggcagacttttcagtgcct  
ttccattcatgacacttcttgaatctctggcagaaccagccagccgtgttcacagtgtcaaataagggatgtcttt  
gattgcttccaggtgttcttcagcaccaccggagggggatgggtgatcagccgaatctttgactcgggctacccatg  
**ggacatggtgttCATGACACGCTTTCAGAACATGTTGAGAAATTCCTCCCAAC** [ct] **CCAATTGTGACTTGGTTGA**  
**TGGAGCGAAAGATAAACA**ACTGGctcaatcatgcaaattacggcttaataccagaagacaggtaaatataatgtgac  
tgccaagggcttttaggaagaaggagcctctgcctgtccagcagcctatacaagccaggcagtagcacagcaacatg  
gctgaatgtgtgggaacacttgatacaaatttgcttgataataacagctaactgttcttaagtactcagaaagtga  
attatgtatttc

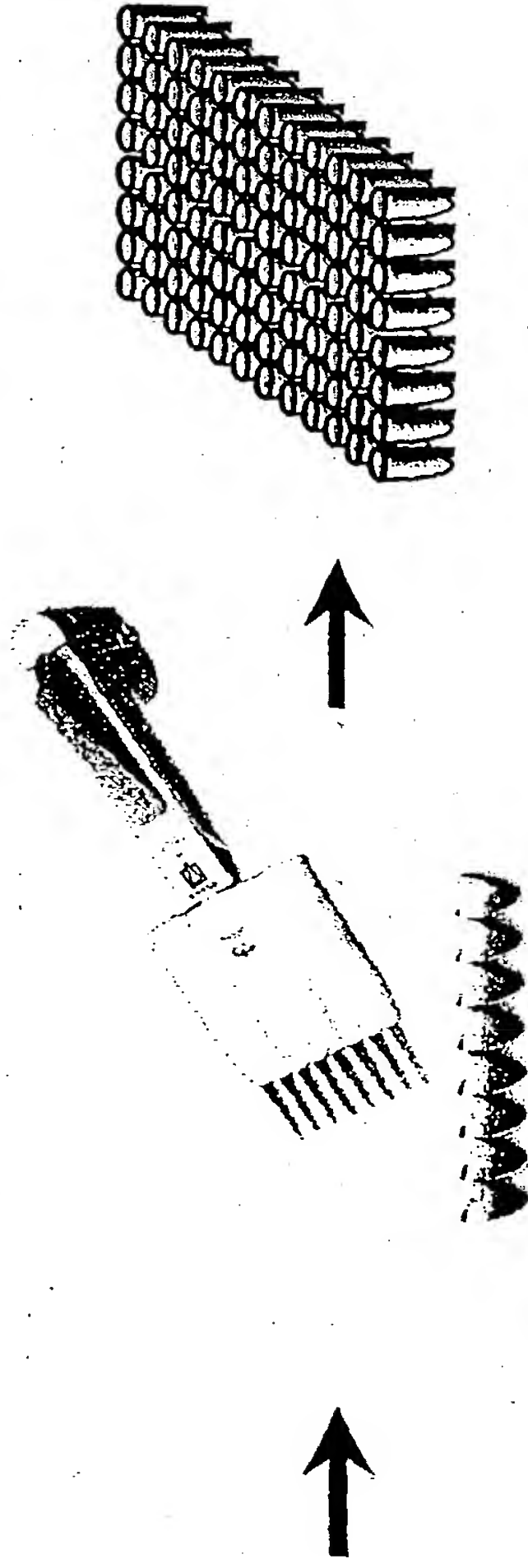
f, cgggctacccatgggaca, 59.38

r, tctggtattaagccgtaatttgcattgattga, 60

Figure 2. Creation of 101 primer sets from sequences available for analysis on the *Invader™ Medically Associated Panel* using *Invader™ Creator Primer Designer v 1.3.3*. (A) Sample input file of a single entry. Information includes TWT SNP#, short name identifier, and sequence with the SNP location indicated in brackets. (B) Sample output file of a the same entry. Information includes the sequence of the “Invader footprint” (capital letters flanking SNP site), forward and reverse primer sequences (bold), and their corresponding Tm’s.

FIGURE 3

# Basic workflow for highly multiplexed PCR using the Invader<sup>TM</sup> Medically Associated Panel (MAP)



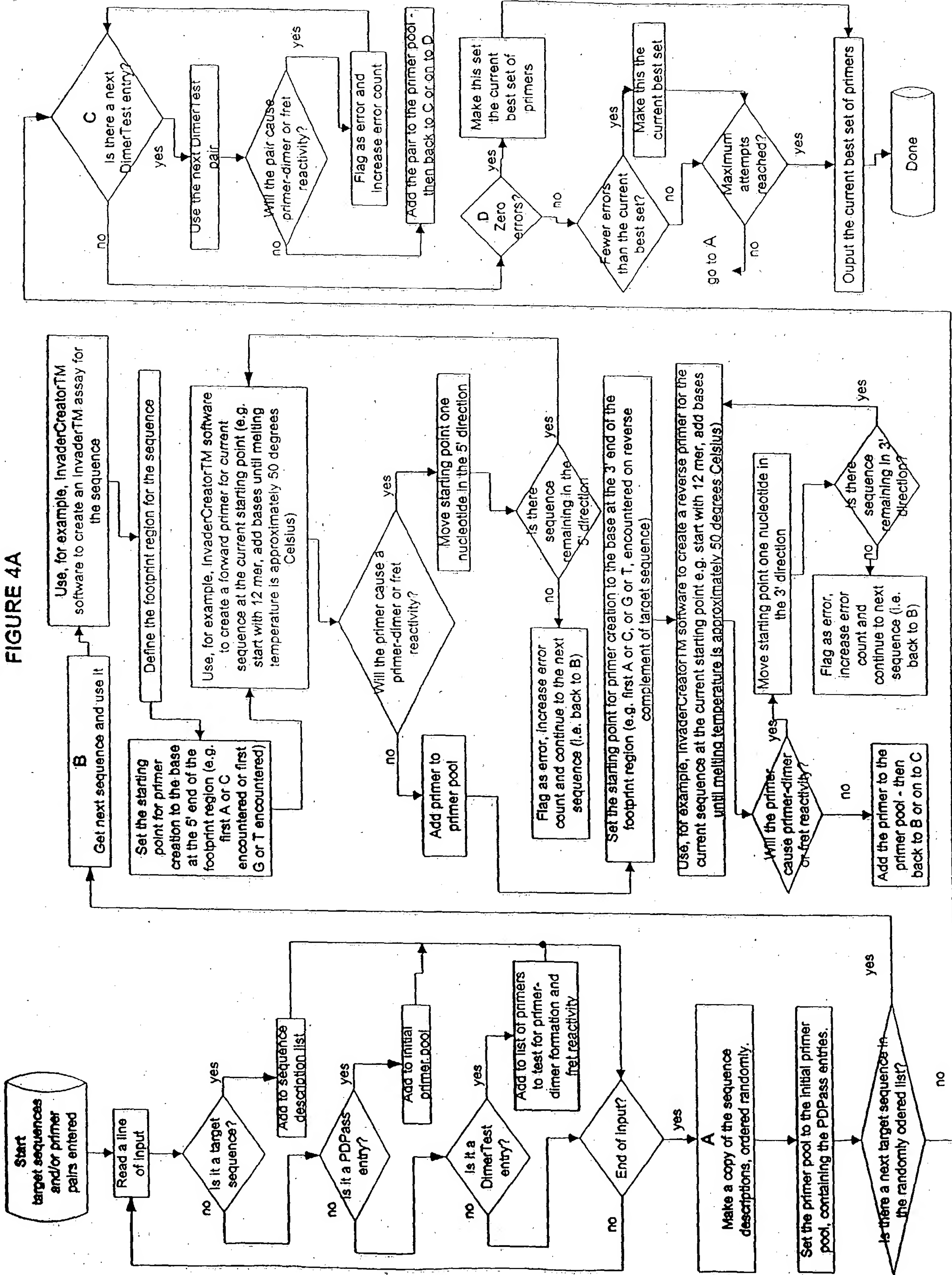
Multiplex PCR (10 ng / template)	Dilute and add directly to Invader <sup>TM</sup>	Incubate at 63°C
	Medically Associated Panel	and read

## Analysis of 101-plex PCR using the Invader<sup>TM</sup>

### Medically Associated Panel

Using primers designed by the *Invader<sup>TM</sup> Creator Primer Designer v 1.3.3* software, highly multiplexed PCR was carried out *without* prior testing of individual "primer sets" in uniplex PCR. Of the 101 possible amplicons, 94 (~93%) were detected by the Invader<sup>TM</sup> assay and made the correct call corresponding to genomic typing of the same sample.

FIGURE 4A



## Figure 5A

CYP2D6 PCR amplification:

Primers:

Triplex PCR protocol

Exons 1 & 2 (2036 nt)

2D6L1F1: 5' – CTGGGCTGGGAGCAGCCTC – 3'

2D6L1R1: 5' – CACTCGCTGGCCTGTTTCATGTC – 3'

Exons 3, 4, 5, & 6 (1683 nt)

2D6L2F: 5' – CTGGAATCCGGTGTCTGAAGTGG – 3'

2D6L2R2: 5' – CTCGGCCCCTGCACTGTTTC – 3'

Exons 7, 8, & 9 (1754 nt)

2D6L3F: 5' – GAGGCAAGAAGGAGTGTCTCAGGG – 3'

2D6L3R5B: 5' – AGTCCTGTGGTGAGGTGACGAGG – 3'

Monoplex PCR protocol

CYP2D6 nucleotides 506 – 856 (\*10 & \*21)

forward (1221-09-01): 5' – ggtagtgaggcaggt – 3'

reverse (1221-09-02): 5' – gcttctggtaggggag – 3'

CYP2D6 nucleotides 1335 – 1616 (\*11 & \*17)

forward (1221-09-03): 5' – aaataggactaggacctgt – 3'

reverse (1221-09-04): 5' – ggggtcccacggaaat – 3'

CYP2D6 nucleotides 2092 – 2582 (\*4, \*6 & \*37)

forward (1221-09-05): 5' – catggccacgcg – 3'

reverse (1221-09-06): 5' – ccggcacctctcg – 3'

CYP2D6 nucleotides 2977 – 3146 (\*3 & \*33)

forward (1221-09-07): 5' – ccgtcctcctgcat – 3'

reverse (1221-09-08): 5' – cactctcaccttctcca – 3'

## Figure 5B

CYP2D6 nucleotides 3294 – 3494 (\*2 R296C & \*7)

forward (1221-09-09): 5' – gttctgtcccgagtatg – 3'

reverse (1221-09-10): 5' – tgcactgtttcccaga – 3'

CYP2D6 nucleotides 3589 – 3918 (\*25, \*26 & \*29)

forward (1221-09-11): 5' – ctgacctcctccaacat – 3'

reverse (1221-09-12): 5' – gggctatcaccaggt – 3'

CYP2D6 nucleotides 4316 – 5226 (\*2, \*27, \*31 & \*32)

forward (1221-09-13): 5' – ctgacctcctccaacat – 3'

reverse (1221-09-15): 5' – gggctatcaccaggt – 3'



Figure 6

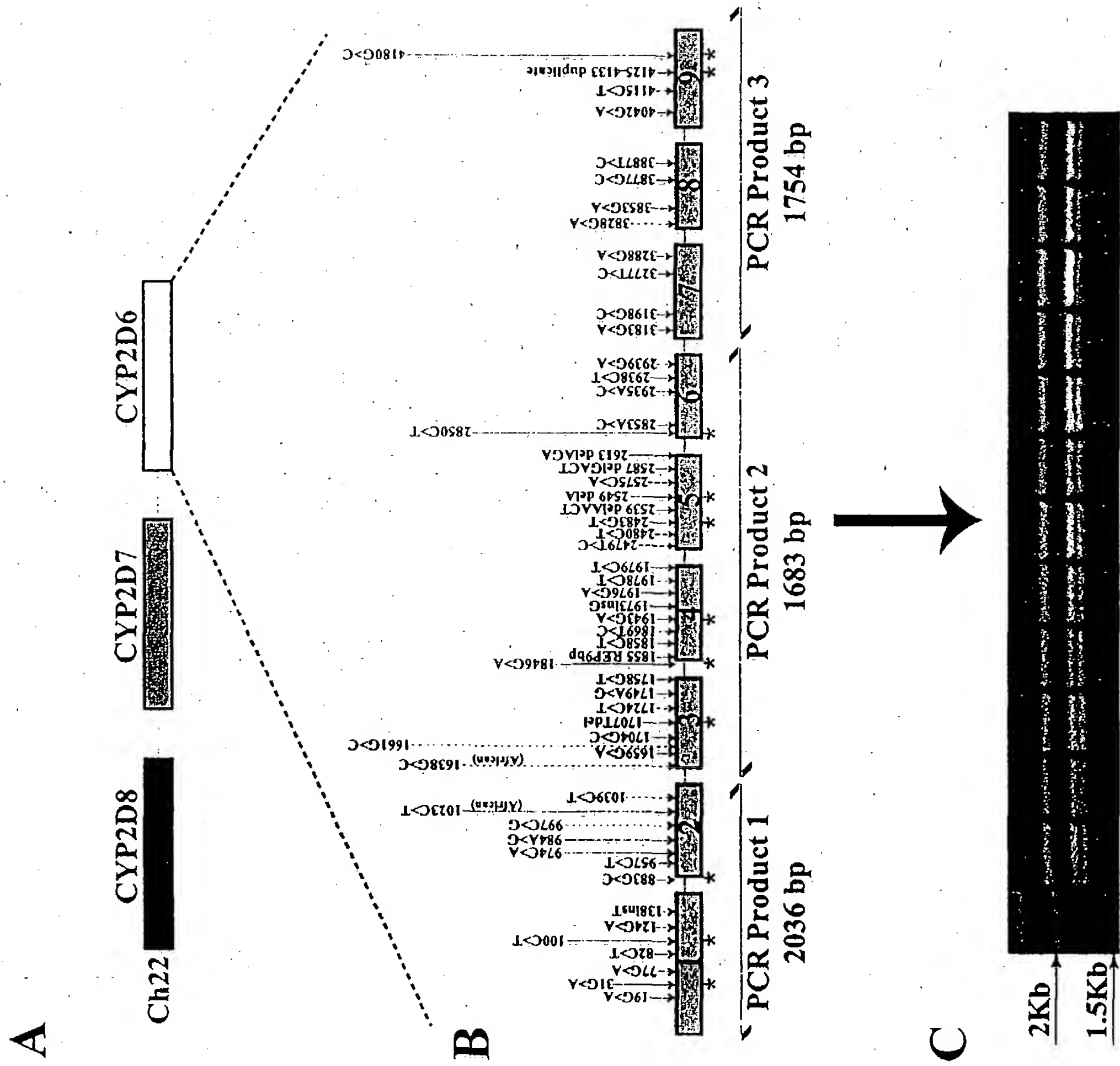


Figure 7A			
Oligo Locus	Oligo Type	Sequence*	
Triplex PCR 1	PCR sense	CTGGGCTGGAGCAGCCTC	SEQ ID NO:264
	PCR anti-sense	CACTCGCTGGCCTGTTTCATGTC	SEQ ID NO:265
Triplex PCR 2	PCR sense	CTGGAATCCGGTGTGGAAGTGG	SEQ ID NO:266
	PCR anti-sense	CTCGGCCCTGCCACTGTTTC	SEQ ID NO:267
Triplex PCR 3	PCR sense	GAGGCAAGAAGAGTGTCAAGG	SEQ ID NO:268
	PCR anti-sense	AGTCCTGTGGTGAGGTGACGAGG	SEQ ID NO:269
CYP2D6-XN (duplication)	PCR sense	GCCACCATGGTGTCTTTGCTTTC	SEQ ID NO:270
	PCR anti-sense	ACCGGATTCAGCTGGGAAATG	SEQ ID NO:271
CYP2D6*5 (deletion)	PCR sense	ACCGGGCACCTGTACTCCTCA	SEQ ID NO:272
	PCR anti-sense	GCATGAGCTAAGGCACCCAGAC	SEQ ID NO:273
CYP2D6 Copy Number assay	2D6 Primary Probe	ACGGACGGGAGTTACAGCACAGGTGC	SEQ ID NO:274
	Actin Primary Probe	CGCGCCGAGGACAGGTAGTCGGTGAGATC	SEQ ID NO:275
	2D6 Invader oligo	CCCGCGCCACCCACACTGAGCC	SEQ ID NO:276
	Actin Invader oligo	AAGAGTAGCCACGCTCGGTGAGGATCTTCATT	SEQ ID NO:277
CYP2D6*10-100 C>T	Invader Oligo	GCAGTGGCAGGGGCGCTGGTGT	SEQ ID NO:278
	Primary Probe 1	ATGACGTGGCAGAGGTAAGCGTGACGC	SEQ ID NO:279
	Primary Probe 2	CGCGCCGAGGAGTAGCGTGCAGCC	SEQ ID NO:280
	Synthetic Target 1	GCTGGGCTGCACGCTACCCACGAGGCCCCCTGCCACTGCCC	SEQ ID NO:281
	Synthetic Target 2	GCTGGGCTGCACGCTACTCAACGAGGCCCCCTGCCACTGCCC	SEQ ID NO:282



Figure 7B

CYP2D6*6-1707	Invader Oligo	CAGGGGGCTCCTCGGTACCT	SEQ ID NO:283
T>Deletion	Primary Probe 1	CGCGCCGAGGCACTGCTCCAGCGA	SEQ ID NO:284
	Primary Probe 2	ATGACGTGGCAGACCTGCTCCAGCGA	SEQ ID NO:285
	Synthetic Target 1	AGAAAGTCGCTGGAGCAGTGGTGACCGAGGAGGCCGCTGCC	SEQ ID NO:286
	Synthetic Target 2	AGAAAGTCGCTGGAGCAGGGGTGACCGAGGAGGCCGCTGCC	SEQ ID NO:287
CYP2D6*4-1846	Invader Oligo	CCTTACCCGCATCTCCACCCCCAT	SEQ ID NO:288
G>A	Primary Probe 1	CGCGCCGAGGAGACGCCCTTTCC	SEQ ID NO:289
	Primary Probe 2	ATGACGTGGCAGACGGACGCCCTTTCC	SEQ ID NO:290
	Synthetic Target 1	GGGGCGAAAGGGCGTCTTGGGGTGGGAGATGCGGGTAAGGGG	SEQ ID NO:291
	Synthetic Target 2	GGGGCGAAAGGGCGTCTTGGGGTGGGAGATGCGGGTAAGGGG	SEQ ID NO:292
CYP2D6*3-2549	Invader Oligo	GCTGGGCTGGTCCCAGGTCATCT	SEQ ID NO:293
A>Deletion	Primary Probe 1	CGCGCCGAGGCTGTGCTCAGTTAGCAG	SEQ ID NO:294
	Primary Probe 2	ATGACGTGGCAGACCGTCTCAGTTAGCAG	SEQ ID NO:295
	Synthetic Target 1	ATGAGCTGCTAACTAGCACAGGATGACCTGGGACCCAGCCAGCCC	SEQ ID NO:296
	Synthetic Target 2	ATGAGCTGCTAACTAGCACGGATGACCTGGGACCCAGCCAGCCC	SEQ ID NO:297
CYP2D6*2-2850	Invader Oligo	GGCAGAGAACAGGTGACGCCACCTATGCT	SEQ ID NO:298
C>T	Primary Probe 1	ATGACGTGGCAGACGAGGTTCTCATCATTGAA	SEQ ID NO:299
	Primary Probe 2	CGCGCCGAGGACAGGTTCTCATCATTGAAG	SEQ ID NO:300
	Synthetic Target 1	GCAGCTTCAATGATGAGAACCTGCGCATAGTGGTGCTGACCTGTTCTCTGCC	SEQ ID NO:301
	Synthetic Target 2	GCAGCTTCAATGATGAGAACCTGTCATAGTGGTGCTGACCTGTTCTCTGCC	SEQ ID NO:302
CYP2D6*2-4180	Invader Oligo	GCCACCATGGTGCTTTGCTTTCCCTGGTGAT	SEQ ID NO:303
G>C	Primary Probe 1	CGCGCCGAGGCCCATCCCTATG	SEQ ID NO:304
	Primary Probe 2	ATGACGTGGCAGACGCCCATCCCTATG	SEQ ID NO:305
	Synthetic Target 1	AGCTCATAGGGGGATGGGGTCACCCAGGAAAGCAAGACACCATGGTGGCTG	SEQ ID NO:306
	Synthetic Target 2	AGCTCATAGGGGGATGGGGTCACCCAGGAAAGCAAGACACCATGGTGGCTG	SEQ ID NO:307

Figure 7C

CYP2D6*18-4125	Invader Oligo	CCGGGGCTGTCCAGTGGGCAT	SEQ ID NO:308
GTGCCCACT>Duplication	Primary Probe 1	CGCGCCGAGGCAGTGGCCACCGA	SEQ ID NO:309
	Primary Probe 2	<u>ATGACGTGGCAGACCCGAGAAGCTGAAGTG</u>	SEQ ID NO:310
	Synthetic Target 1	GCAGCACTTCAGCTTCTCGGTGCCCACTGTGCCCACTGGACAGCCCCGGCC	SEQ ID NO:311
	Synthetic Target 2	GCAGCACTTCAGCTTCTCGGTGCCCACTGGACAGCCCCGGCC	SEQ ID NO:312
CYP2D6*11-883	Invader Oligo	CCCGAAGCGCGCCGCAAT	SEQ ID NO:313
G>C	Primary Probe 1	CGCGCCGAGGCTGCAGAGGGAGGG	SEQ ID NO:314
	Primary Probe 2	ATGACGTGGCAGACCGTGCAGAGGGAGGG	SEQ ID NO:315
	Synthetic Target 1	CTGACCCCTCCCTCTGCAGTTGCGGCCCGCTTCGGGGA	SEQ ID NO:316
	Synthetic Target 2	CTGACCCCTCCCTCTGCAGTTGCGGCCCGCTTCGGGGA	SEQ ID NO:317
CYP2D6*35-31	Invader Oligo	GGCTAGAAGCACTGRTGCCCTGGCCT	SEQ ID NO:318
G>A	Primary Probe 1	ATGACGTGGCAGACGTGATAGTGCCCATCTTC	SEQ ID NO:319
	Primary Probe 2	<u>CGCGCCGAGGATGATAGTGCCCATCTTC</u>	SEQ ID NO:320
	Synthetic Target 1	GCAGGAAGATGGCCACTATCACGGCCAGGGGCAYCAGTGCTTCTAGCCCC	SEQ ID NO:321
	Synthetic Target 2	GCAGGAAGATGGCCACTATCATGGCCAGGGGCAYCAGTGCTTCTAGCCCC	SEQ ID NO:322
CYP2D6*33-2483	Invader Oligo	AGCCTTTTGAAGCGTAGGACCTTGCCAGT	SEQ ID NO:323
G>T	Primary Probe 1	<u>ATGACGTGGCAGACCCAGCGCTGGGATA</u>	SEQ ID NO:324
	Primary Probe 2	CGCGCCGAGGACAGCGCTGGGATAT	SEQ ID NO:325
	Synthetic Target 1	CTGCATATCCAGCGCTGGCTGGCAAGGTCCTACGCTTCCAAAAGGCTTT	SEQ ID NO:326
	Synthetic Target 2	CTGCATATCCAGCGCTGTCTGGCAAGGTCCTACGCTTCCAAAAGGCTTT	SEQ ID NO:327
CYP2D6*37-1943	Invader Oligo	CTGAGCTAGGTCACAGCCCTGAGGAAGA	SEQ ID NO:328
G>A	Primary Probe 1	<u>ATGACGTGGCAGACCCAGGGTCGTGTAC</u>	SEQ ID NO:329
	Primary Probe 2	<u>CGCGCCGAGGTGAGGGTCGTGTAC</u>	SEQ ID NO:330
	Synthetic Target 1	TCGAGTACGACGACCCCTCGCTTCTCAGGCTGCTGGACCTAGCTCAGG	SEQ ID NO:331
	Synthetic Target 2	TCGAGTACGACGACCCCTCACTTCTCAGGCTGCTGGACCTAGCTCAGG	SEQ ID NO:332
* Underlined sequence represents the Primary Probe Arm or 'Flap'.			

Figure 8

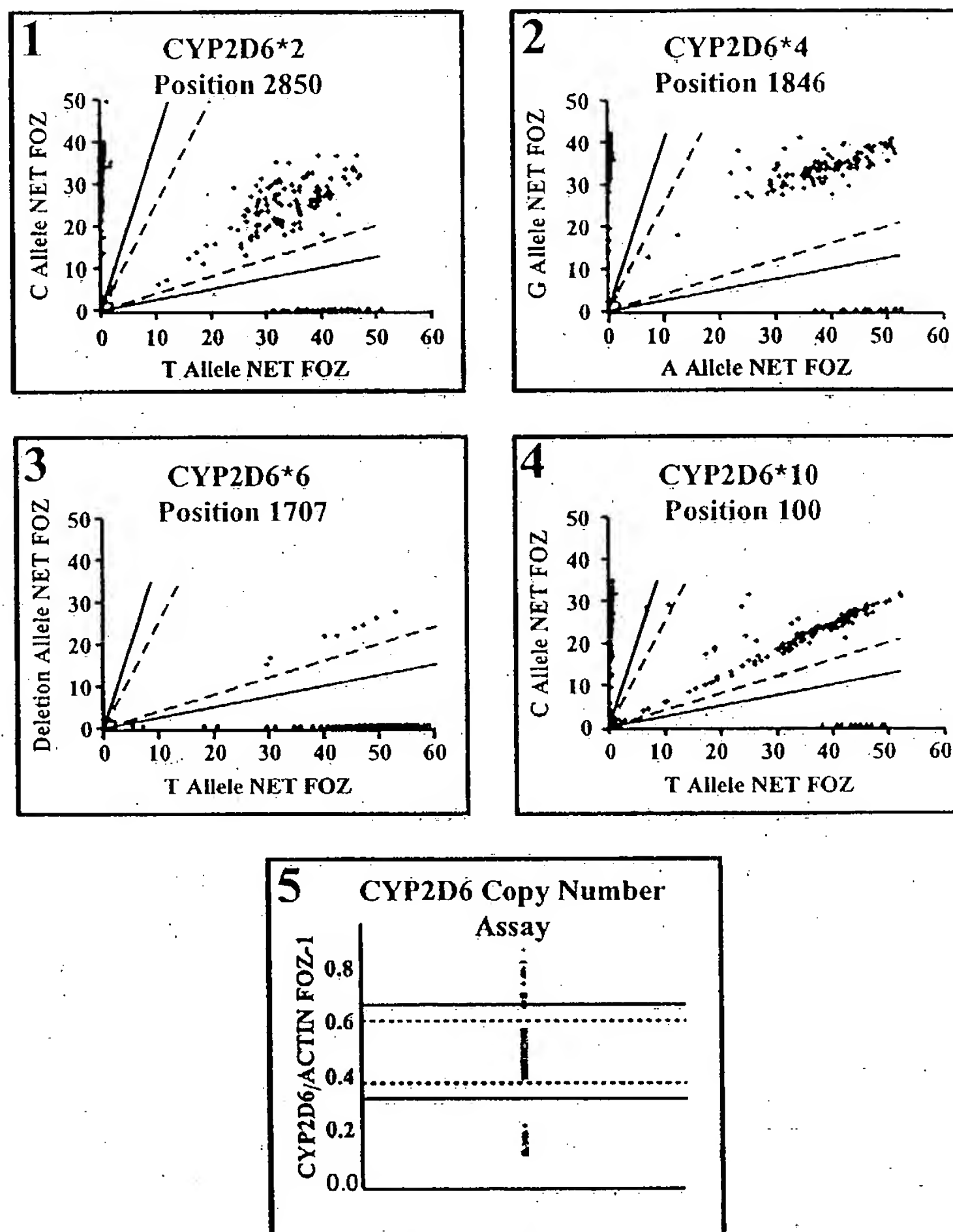


Figure 9

Position	31	100	883	1707	1846	1943	2483	2549	2850	4125-4133	4180
Allele	*35	*10	*11	*6	*4	*37	*33	*3	*2	*18	*2
PCR product	PCR1	PCR1	PCR1	PCR2	PCR2	PCR2	PCR2	PCR2	PCR2	PCR3	PCR3
Polymorphism	G>A	C>T	G>C	T>Del	G>A	G>A	G>T	A>Del	C>T	duplication	G>C
Effect	V11M	P34S	splice defect	frameshift	splice defect	R201H	A237S	frameshift	R296C	468VPT470	S486T
n=	172	171	174	174	173	174	173	172	173	174	173
WT frequency	157	97	174	170	102	174	169	164	89	174	41
HET frequency	14	66	0	4	64	0	4	8	60	0	76
Mut frequency	1	8	0	0	7	0	0	0	24	0	56
Hardy Weinberg	$\chi^2_{1.2}$ (p=0.28)	$\chi^2_{0.6}$ (p=0.44)		$\chi^2_{0.0}$ (p=0.88)	$\chi^2_{0.6}$ (p=0.4)		$\chi^2_{0.0}$ (p=0.88)	$\chi^2_{0.1}$ (p=0.75)	$\chi^2_{6.4}$ (p=0.011)		$\chi^2_{2.3}$ (p=0.13)
Rare allele frequency	4.6	24	0	1.2	22.5	0	1.2	2.3	31.2	0	54.3
EM frequency*	4.6	23.8	0	1.2	22.7		1.2	2.3	31.4	0	54.7
Published Freq	6.70%	18(Asi 16)	0.1	1.8	18(Afr 6.3)	0.1(Afr 0.01)	0.6	1.7	34(Asi 18)	Asi 0.7	53(Asi 65)

EM frequency= Allele frequency as generated by the Expectation Maximisation algorithm implemented in the Arlequin genetic software

Figure 10

Haplotype	Freq.	s.d.	G31	C100	G883	INS1707	G1846	G1943	G2483	INS2549	C2850	DEL4125	G4180
CYP2D6*1	0.401	0.027	G31	C100	G883	INS1707	G1846	G1943	G2483	INS2549	C2850	DEL4125	G4180
CYP2D6*2	0.262	0.024	G31	C100	G883	INS1707	G1846	G1943	G2483	INS2549	T2850	DEL4125	C4180
CYP2D6*4	0.221	0.024	G31	T100	G883	INS1707	A1846	G1943	G2483	INS2549	C2850	DEL4125	C4180
CYP2D6*35	0.047	0.013	A31	C100	G883	INS1707	G1846	G1943	G2483	INS2549	T2850	DEL4125	C4180
CYP2D6*3	0.029	0.012	G31	C100	G883	INS1707	G1846	G1943	G2483	DEL2549	C2850	DEL4125	G4180
CYP2D6*6	0.012	0.007	G31	C100	G883	DEL1707	G1846	G1943	G2483	INS2549	C2850	DEL4125	G4180
CYP2D6*33	0.012	0.007	G31	C100	G883	INS1707	G1846	G1943	T2483	INS2549	C2850	DEL4125	G4180
CYP2D6*10	0.012	0.007	G31	T100	G883	INS1707	G1846	G1943	G2483	INS2549	C2850	DEL4125	C4180
CYP2D6*4k	0.006	0.004	G31	T100	G883	INS1707	A1846	G1943	G2483	INS2549	T2850	DEL4125	C4180

Figure 11

Number of functional Alleles	Compound Haplotype	Number of Subjects
2	*1/*1	31
	*1/*2	26
	*2/*2	15
	*2/*35	8
	*1/*35	3
	*1/*33	3
	*1/*10	2
	*2/*10	1
	*2/*33	1
	*35/*35	1
1	*1/*4	35
	*2/*4	22
	*1/*3	4
	*2/*3	2
	*4/*35	3
	*1/*6	2
	*4/*10	1
	*2/*6	1
0	*4/*4	7
	*3/*4	2
	*4/*6	1



Figure 12A

	SNPName	OligoType	SequenceOligo
SEQ ID NO: 1	CYP2D6*10(188C>T)_AS	Invader oligo	CCAACGCTGGGCTGCACGCTACA
SEQ ID NO: 2	CYP2D6*10(188C>T)_AS	Probe	ACGGACGCGGAGCCACCAGGCCCCV
SEQ ID NO: 3	CYP2D6*10(188C>T)_AS	Probe	CGCGCCGAGGTACACAGGCCCCV
SEQ ID NO: 4	CYP2D6*10(188C>T)_AS	Target	GCAGGGGGCCTGGTGGGTAGCGTGCAGCCACGCGTTGGCG
SEQ ID NO: 5	CYP2D6*10(188C>T)_AS	Target	GCAGGGGGCCTGGTGGGTAGCGTGCAGCCACGCGTTGGCG
SEQ ID NO: 6	CYP2D6*14(1846G>A)_AS	Invader oligo	GCGGCCCTTCGCCCAACCACCTCCT
SEQ ID NO: 7	CYP2D6*14(1846G>A)_AS	Probe	ACGGACGCGGAGGGTGGGTGATGGGV
SEQ ID NO: 8	CYP2D6*14(1846G>A)_AS	Probe	CGCGCCGAGGAGTGGGTGATGGCV
SEQ ID NO: 9	CYP2D6*14(1846G>A)_AS	Target	TTCTGCCCATCACCCACCCAGCGAGTGGTGGCGAAGCGGGCAC
SEQ ID NO: 10	CYP2D6*14(1846G>A)_AS	Target	TTCTGCCCATCACCCACCCAGCGAGTGGTGGCGAAGCGGGCAC
SEQ ID NO: 11	CYP2D6*18(insertion)_S	Invader oligo	CCGGGGCTGTCCAGTGGGCAT
SEQ ID NO: 12	CYP2D6*18(insertion)_S	Probe	CGCGCCGAGGCAGTGGGCACCCGAV
SEQ ID NO: 13	CYP2D6*18(insertion)_S	Probe	ACGGACGCGGAGCCGAGAAGCTGAAGTGV
SEQ ID NO: 14	CYP2D6*18(insertion)_S	Target	GCAGCACTTCAGCTTCTCGGTGCCCACTGTGCCCACTGGACAGCCCCGGCC
SEQ ID NO: 15	CYP2D6*18(insertion)_S	Target	GCAGCACTTCAGCTTCTCGGTGCCCACTGGACAGCCCCGGCC
SEQ ID NO: 16	CYP2D6*18(insertion)_AS	Invader oligo	CTCCCTGCTGCAGCACTTCAGCTTCTCT
SEQ ID NO: 17	CYP2D6*18(insertion)_AS	Probe	CGCGCCGAGGGGTGCCCACTGTGV
SEQ ID NO: 18	CYP2D6*18(insertion)_AS	Probe	ACGGACGCGGAGGGTGCCCACTGGAV
SEQ ID NO: 19	CYP2D6*18(insertion)_AS	Target	GCTGTCCAGTGGGCACAGTGGGCACCCGAGAAGCTGAAGTGTGCAGCAGGGAGGT
SEQ ID NO: 20	CYP2D6*18(insertion)_AS	Target	GCTGTCCAGTGGGCACCCGAGAAGCTGAAGTGTGCAGCAGGGAGGT
SEQ ID NO: 21	CYP2D6*2(2938C>T)_AS	Invader oligo	GAACCCTGAGAGCAGCTTCAATGATGAGAACCTGA
SEQ ID NO: 22	CYP2D6*2(2938C>T)_AS	Probe	ACGGACGCGGAGCGCATAGTGGTGGCV
SEQ ID NO: 23	CYP2D6*2(2938C>T)_AS	Probe	CGCGCCGAGGTGCATAGTGGTGGCTV
SEQ ID NO: 24	CYP2D6*2(2938C>T)_AS	Target	GGTCAGCCACCACCTATGCCAGGTTCTCATCATTTGAAGCTGCTCTCAGGGTTCCC
SEQ ID NO: 25	CYP2D6*2(2938C>T)_AS	Target	GGTCAGCCACCACCTATGCACAGGTTCTCATCATTTGAAGCTGCTCTCAGGGTTCCC
SEQ ID NO: 26	CYP2D6*2(4268G>C)_AS	Invader oligo	CCACCATGGTGTCCTTTCCTTCTGGTGAT
SEQ ID NO: 27	CYP2D6*2(4268G>C)_AS	Probe	ACGGACGCGGAGGCCCATCCCCCTATV

Figure 12B

	SNPName	OligoType	SequenceOligo
SEQ ID NO: 28	CYP2D6*2(4268G>C) AS	Probe	CGGCGGAGGCCCATCCCCCTATV
SEQ ID NO: 29	CYP2D6*2(4268G>C) AS	Target	GCTCATAGGGGATGGGCTCACCAGGAAAGCAAGACACCATGGTGGCT
SEQ ID NO: 30	CYP2D6*2(4268G>C) AS	Target	GCTCATAGGGGATGGGCTCACCAGGAAAGCAAGACACCATGGTGGCT
SEQ ID NO: 31	CYP2D6*3(2637A>del) AS	Invader oligo	CCAGCTGGATGAGCTGCTAACTGAGCAT
SEQ ID NO: 32	CYP2D6*3(2637A>del) AS	Probe	CGCGCCGAGGCAGGATGACCTGGGAV
SEQ ID NO: 33	CYP2D6*3(2637A>del) AS	Probe	ACGGACGCGGAGCGGATGACCTGGGAV
SEQ ID NO: 34	CYP2D6*3(2637A>del) AS	Target	CTGGGTCCCAGGTCATCCTGTGCTCAGTTAGCAGTCATCCAGCTGGGTC
SEQ ID NO: 35	CYP2D6*3(2637A>del) AS	Target	CTGGGTCCCAGGTCATCCTGTGCTCAGTTAGCAGTCATCCAGCTGGGTC
SEQ ID NO: 36	CYP2D6*4(1934G>A) AS	Invader oligo	CTTACCCGCATCTCCACCCCCAT
SEQ ID NO: 37	CYP2D6*4(1934G>A) AS	Probe	ACGGACGCGGAGGGAGCGCCCTTTTCV
SEQ ID NO: 38	CYP2D6*4(1934G>A) AS	Probe	CGGCGGAGGAGACGCCCTTTTCV
SEQ ID NO: 39	CYP2D6*4(1934G>A) AS	Target	GGGCGGAAAGGGCGCTCCTGGGGTGGGAGATGCGGGTAAGGG
SEQ ID NO: 40	CYP2D6*4(1934G>A) AS	Target	GGGCGGAAAGGGCGCTCCTGGGGTGGGAGATGCGGGTAAGGG
SEQ ID NO: 41	CYP2D6*6(1795T>del) AS	Invader oligo	CCTGGGCAAGAAGTCGCTGGAGCAT
SEQ ID NO: 42	CYP2D6*6(1795T>del) AS	Probe	CGGCGGAGGGTGGTGACCCGAGGV
SEQ ID NO: 43	CYP2D6*6(1795T>del) AS	Probe	ACGGACGCGGAGGGGTGACCCGAGGV
SEQ ID NO: 44	CYP2D6*6(1795T>del) AS	Target	GGCCTCCTCGGTCAACCCACTGCTCCAGCGGACTTCTTGCCCCAGGCC
SEQ ID NO: 45	CYP2D6*6(1795T>del) AS	Target	GGCCTCCTCGGTCAACCCACTGCTCCAGCGGACTTCTTGCCCCAGGCC
SEQ ID NO: 46	CYP2D6*7(3023A>C) AS	Invader oligo	CCTGGGGCCTCCTGCTCATGATCCTACT
SEQ ID NO: 47	CYP2D6*7(3023A>C) AS	Probe	CGGCGCGAGGATCCGGATGTGCAGV
SEQ ID NO: 48	CYP2D6*7(3023A>C) AS	Probe	ACGGACGCGGAGCTCCGGATGTGCAGV
SEQ ID NO: 49	CYP2D6*7(3023A>C) AS	Target	CACGCTGCACATCCGGATGTAGGATCATGAGCAGGAGGCCCCAGGCC
SEQ ID NO: 50	CYP2D6*7(3023A>C) AS	Target	CACGCTGCACATCCGGAGGTAGGATCATGAGCAGGAGGCCCCAGGCC
SEQ ID NO: 51	CYP2D6*8(1846G>T) AS	Invader oligo	GCCGCCTTGCCCAACCACTCCC
SEQ ID NO: 52	CYP2D6*8(1846G>T) AS	Probe	ACGGACGCGGAGGGTGGGTGATGGGV
SEQ ID NO: 53	CYP2D6*8(1846G>T) AS	Probe	CGGCGCGAGGTGTGGGTGATGGGCV
SEQ ID NO: 54	CYP2D6*8(1846G>T) AS	Target	TTCTGCCCATCACCCACCGGAGTGGTTGGCGAAGGGCGGCAC

Figure 12C

	SNPName	Oligo Type	Sequence@ligo
SEQ ID NO: 55	CYP2D6*8(1846G>T) AS	Target	TTCTGCCCATCACCCACAGGAGTGGTTGGCGAAGCGGCAC
SEQ ID NO: 56	2D6*2	Invader oligo	GCCACCATGGTGTCTTTGCTTTCTGCTGAT
SEQ ID NO: 57	2D6*2	Probe	CGGCCGAGGCCCATCCCTATGV
SEQ ID NO: 58	2D6*2	Probe	ACGGACGGGAGGCCCATCCCCCTATV
SEQ ID NO: 59	2D6*2	Target	AGCTCATAGGGGATGGGTCACCAAGAAAGCAACCATGGTGGCTG
SEQ ID NO: 60	2D6*2	Target	AGCTCATAGGGGATGGGTCACCAAGAAAGCAACCATGGTGGCTG
SEQ ID NO: 61	CYP2D6*3 frameshift	Invader oligo	GCTGGGCTGGTCCCAGGTCATCT
SEQ ID NO: 62	CYP2D6*3 frameshift	Probe	CGGCCGAGGCTGTGCTCAGTTAGCAGV
SEQ ID NO: 63	CYP2D6*3 frameshift	Probe	ACGGACGGGAGCGTGTCTCAGTTAGCAGV
SEQ ID NO: 64	CYP2D6*3 frameshift	Target	ATGAGCTGCTAACTGAGCACAGGATGACCTGGGACCCAGCCAGCCC
SEQ ID NO: 65	CYP2D6*3 frameshift	Target	ATGAGCTGCTAACTGAGCACAGGATGACCTGGGACCCAGCCAGCCC
SEQ ID NO: 66	2D6*4	Invader oligo	CCTACCGCATCTCCACCCCAT
SEQ ID NO: 67	2D6*4	Probe	CGGCCGAGGAGACGCCCTTTTCGV
SEQ ID NO: 68	2D6*4	Probe	ACGGACGGGAGGACGCCCTTTTCV
SEQ ID NO: 69	2D6*4	Target	GGGGCGAAAGGGCGCTTTGGGGTGGGAGATCGGGTAAGGGG
SEQ ID NO: 70	2D6*4	Target	GGGGCGAAAGGGCGCTTTGGGGTGGGAGATCGGGTAAGGGG
SEQ ID NO: 71	2D6*6	Invader oligo	CAGGCGGCTCCTCGGTCACT
SEQ ID NO: 72	2D6*6	Probe	CGGCCGAGGCACTGCTCCAGCGAV
SEQ ID NO: 73	2D6*6	Probe	ACGGACGGGAGGCTGCTCCAGCGAV
SEQ ID NO: 74	2D6*6	Target	AGAAATCGCTGGAGCAGTGGGTGACCCAGGAGGCCCTGCC
SEQ ID NO: 75	2D6*6	Target	AGAAATCGCTGGAGCAGGAGTGGGTGACCCAGGAGGCCCTGCC
SEQ ID NO: 76	2D6*7	Invader oligo	GGGCTACGCTGCACATCCGGAC
SEQ ID NO: 77	2D6*7	Probe	CGGCCGAGGTTAGGATCATGAGCAGV
SEQ ID NO: 78	2D6*7	Probe	ACGGACGGGAGGTTAGGATCATGAGCAGV
SEQ ID NO: 79	2D6*7	Target	GCCTCCTGCTCATGATCCTACATCCGGATGTCAGCGTGAGCCCAT
SEQ ID NO: 80	2D6*7	Target	GCCTCCTGCTCATGATCCTACATCCGGATGTCAGCGTGAGCCCAT
SEQ ID NO: 81	CYP2D6 P34S	Invader oligo	GCAGTGGCAGGGGCCCTGGTGT

# Figure 12D

	SNP Name	Oligo Type	Sequence Oligo
SEQ ID NO: 82	CYP2D6_P34S	Probe	ACGGACGCGGAGGGTAGCGTGACGCV
SEQ ID NO: 83	CYP2D6_P34S	Probe	CGCGCCGAGGAGTAGCGTGACGCCV
SEQ ID NO: 84	CYP2D6_P34S	Target	GCTGGGCTGCACGCTACCCACCCAGGCCCCCTGCCACTGCC
SEQ ID NO: 85	CYP2D6_P34S	Target	GCTGGGCTGCACGCTACTCACCAGGCCCCCTGCCACTGCC
SEQ ID NO: 86	CYP2D6*11_splice	Invader oligo	AGGCCCTGACCCCTCCCTCTGCAT
SEQ ID NO: 87	CYP2D6*11_splice	Probe	CGCGCCGAGGTTGCGGGGCCV
SEQ ID NO: 88	CYP2D6*11_splice	Probe	ACGGACGCGGAGCTTGC GGCGCCV
SEQ ID NO: 89	CYP2D6*11_splice	Target	AAGCGCGCGCGCAACTGCAGAGGGAGGGTCAGGGCCTCT
SEQ ID NO: 90	CYP2D6*11_splice	Target	AAGCGCGCGCGCAAGTGCAGAGGGAGGGTCAGGGCCTCT
SEQ ID NO: 91	CYP2D6_H94R	Invader oligo	CGCGAGGCGCTGGTGACCC
SEQ ID NO: 92	CYP2D6_H94R	Probe	ACGGACGCGGAGACGGCGGAGGACACV
SEQ ID NO: 93	CYP2D6_H94R	Probe	CGCGCCGAGGCGCGGAGGACAV
SEQ ID NO: 94	CYP2D6_H94R	Target	GGCGGTGTCTCGCCGTGGTCCAGCGCCTCGCGCA
SEQ ID NO: 95	CYP2D6_H94R	Target	GGCGGTGTCTCGCCGTGGTCCAGCGCCTCGCGCA
SEQ ID NO: 96	CYP2D6_1039[CT]	Invader oligo	TGTGCCCATCACCCAGATCCTGGGTTTA
SEQ ID NO: 97	CYP2D6_1039[CT]	Probe	ACGGACGCGGAGCGGGCGCGCTV
SEQ ID NO: 98	CYP2D6_1039[CT]	Probe	CGCGCCGAGGTGGCGCGCGTTV
SEQ ID NO: 99	CYP2D6_1039[CT]	Target	TGGGAACGCGCGCCCGAAACCCAGGATCTGGGTGATGGGCACAGG
SEQ ID NO: 100	CYP2D6_1039[CT]	Target	TGGGAACGCGCGCCCGAAACCCAGGATCTGGGTGATGGGCACAGG
SEQ ID NO: 101	CYP2D6_1661[GT]	Invader oligo	GCGAGCAGAGCGGCTTCTCCGTT
SEQ ID NO: 102	CYP2D6_1661[GT]	Probe	CGCGCCGAGGTTCCACCTTGCGCV
SEQ ID NO: 103	CYP2D6_1661[GT]	Probe	ACGGACGCGGAGTCCACCTTGCGCV
SEQ ID NO: 104	CYP2D6_1661[GT]	Target	AGTTGCGCAAGGTGGACACGGAGAGCGCCCTCTGCTCGCGC
SEQ ID NO: 105	CYP2D6_1661[GT]	Target	AGTTGCGCAAGGTGGAGACGGAGAGCGCCCTCTGCTCGCGC
SEQ ID NO: 106	CYP2D6*8_G169X	Invader oligo	TGCCGCTTCCGCAACCACTCCC
SEQ ID NO: 107	CYP2D6*8_G169X	Probe	ACGGACGCGGAGGTGGGTGATGGGCV
SEQ ID NO: 108	CYP2D6*8_G169X	Probe	CGCGCCGAGGTGGGTGATGGGCV



Figure 12E

	SNPName	OligoType	SequenceOligo
SEQ ID NO: 109	CYP2D6*8_G169X	Target	TTCTGCCCATCACCCACCGGAGTGGTTGGCGAAGGCGGCACA
SEQ ID NO: 110	CYP2D6*8_G169X	Target	TTCTGCCCATCACCCACAGGAGTGGTTGGCGAAGGCGGCACA
SEQ ID NO: 111	CYP2D6_G212E	Invader oligo	CAGGCTGCTGGACCTAGCTCAGGAGGT
SEQ ID NO: 112	CYP2D6_G212E	Probe	CGCGCCGAGGGAGTGAAGGAGGAGTGGV
SEQ ID NO: 113	CYP2D6_G212E	Probe	ACGGACGCGGAGAACTGAAGGAGGAGTGGV
SEQ ID NO: 114	CYP2D6_G212E	Target	AGCCCGACTCCTCTTTCAGTCCCTCCTCCTAGCTAGGTCCAGCAGCCTGAG
SEQ ID NO: 115	CYP2D6_G212E	Target	AGCCCGACTCCTCTTTCAGTCCCTCCTCCTAGCTAGGTCCAGCAGCCTGAG
SEQ ID NO: 116	CYP2D6*9_K281del	Invader oligo	CCTGACTGAGGCCCTTCTGGCAGAGATGT
SEQ ID NO: 117	CYP2D6*9_K281del	Probe	CGCGCCGAGGGAGAAAGTGAAGTGGCV
SEQ ID NO: 118	CYP2D6*9_K281del	Probe	ACGGACGCGGAGGAGGTGAGAGTGGCTV
SEQ ID NO: 119	CYP2D6*9_K281del	Target	CGTGGCAGCCACTCTCACCTTCTCCATCTCTGCCAGGAAGCCTCAGTCAGGTC
SEQ ID NO: 120	CYP2D6*9_K281del	Target	CGTGGCAGCCACTCTCACCTTCTCCATCTCTGCCAGGAAGCCTCAGTCAGGTC
SEQ ID NO: 121	CYP2D6_R296C	Invader oligo	GAACCTGAGAGCAGCTTCAA'TGATGAGAACCTGA
SEQ ID NO: 122	CYP2D6_R296C	Probe	CGCGCCGAGGGCAGTAGTGGTGGCV
SEQ ID NO: 123	CYP2D6_R296C	Probe	ACGGACGCGGAGTGCATAGTGGTGGCTV
SEQ ID NO: 124	CYP2D6_R296C	Target	GGTCAGCCACCAGTATGCGCAGGTTCATCATCATTGAAGCTGCTCTCAGGGTTCCC
SEQ ID NO: 125	CYP2D6_R296C	Target	GGTCAGCCACCAGTATGCGCAGGTTCATCATCATTGAAGCTGCTCTCAGGGTTCCC
SEQ ID NO: 126	CYP2D6_L421P	Invader oligo	CTTCGGCTTCCACCCCGAACACTTCCA
SEQ ID NO: 127	CYP2D6_L421P	Probe	ACGGACGCGGAGTGGATGCCACAGGV
SEQ ID NO: 128	CYP2D6_L421P	Probe	CGCGCCGAGGGCGGATGCCACAGGV
SEQ ID NO: 129	CYP2D6_L421P	Target	GTGGCCCTGGGCATCCAGGAAGTTCGGGGTGAAGCGGAAGGG
SEQ ID NO: 130	CYP2D6_L421P	Target	GTGGCCCTGGGCATCCGGGAAGTTCGGGGTGAAGCGGAAGGG
SEQ ID NO: 131	CYP2D6_1661[GT]	Invader oligo	AGCCCCAAGTTGCGCAAGGTGGAT
SEQ ID NO: 132	CYP2D6_1661[GT]	Probe	CGCGCCGAGGGACGGAGAAGCGCV
SEQ ID NO: 133	CYP2D6_1661[GT]	Probe	ACGGACGCGGAGGACGGAGAAGCGCV
SEQ ID NO: 134	CYP2D6_1661[GT]	Target	AGAGGCGCTTCTCCGTGTCACCTTGGCAACTTGGGCCTGG
SEQ ID NO: 135	CYP2D6_1661[GT]	Target	AGAGGCGCTTCTCCGTGTCACCTTGGCAACTTGGGCCTGG

Figure 12F

	SNPName	OligoType	SequenceOligo
SEQ ID NO: 136	CYP2D6*11 splice S	Invader oligo	CCCGAAGCGGCGCGCAAT
SEQ ID NO: 137	CYP2D6*11 splice S	Probe	CGCGCCGAGGCTGCAGAGGAGGGV
SEQ ID NO: 138	CYP2D6*11 splice S	Probe	ACGGACGCGGAGGTGCAGAGGGAGGGV
SEQ ID NO: 139	CYP2D6*11 splice S	Target	CTGACCCCTCCCTCTGCAGTTGCGCGCGCTTCGGGGA
SEQ ID NO: 140	CYP2D6*11 splice S	Target	CTGACCCCTCCCTCTGCAGTTGCGCGCGCTTCGGGGA
SEQ ID NO: 141	CYP2D6 H94R S	Invader oligo	GGTCGGCGGTGTCTCGCCGA
SEQ ID NO: 142	CYP2D6 H94R S	Probe	ACGGACGCGGAGTGGTCAACAGCGV
SEQ ID NO: 143	CYP2D6 H94R S	Probe	CGCGCCGAGGCGGTCAACAGCGV
SEQ ID NO: 144	CYP2D6 H94R S	Target	GAGGCGCTGGTGACCCACGGCGGAGGACACCGCCGACCCG
SEQ ID NO: 145	CYP2D6 H94R S	Target	GAGGCGCTGGTGACCCACGGCGGAGGACACCGCCGACCCG
SEQ ID NO: 146	CYP2D6 1039[CT] S	Invader oligo	CTTGCCCTTGGGAACGCGGCCCT
SEQ ID NO: 147	CYP2D6 1039[CT] S	Probe	CGCGCCGAGGGAACCCAGGATCTGGV
SEQ ID NO: 148	CYP2D6 1039[CT] S	Probe	ACGGACGCGGAGAAAACCCAGGATCTGGV
SEQ ID NO: 149	CYP2D6 1039[CT] S	Target	TCACCCAGATCCTGGGTTTCGGGCGCGGTTCCCAAGGCAAGCA
SEQ ID NO: 150	CYP2D6 1039[CT] S	Target	TCACCCAGATCCTGGGTTTCGGGCGCGGTTCCCAAGGCAAGCA
SEQ ID NO: 151	CYP2D6*8 G169X S	Invader oligo	CTTTGTGCCCTTCTGCCCATCACCCACT
SEQ ID NO: 152	CYP2D6*8 G169X S	Probe	CGCGCCGAGGCGGAGTGTTGGCV
SEQ ID NO: 153	CYP2D6*8 G169X S	Probe	ACGGACGCGGAGAGGAGTGGTTGGCV
SEQ ID NO: 154	CYP2D6*8 G169X S	Target	CCTTCGCCAACCACTCCGTTGGTGATGGGCAGAGGCAAAAGCG
SEQ ID NO: 155	CYP2D6*8 G169X S	Target	CCTTCGCCAACCACTCCGTTGGTGATGGGCAGAGGCAAAAGCG
SEQ ID NO: 156	CYP2D6 G212E S	Invader oligo	CGCAGAAAGCCCGACTCCTCCTTCACTA
SEQ ID NO: 157	CYP2D6 G212E S	Probe	ACGGACGCGGAGCCCTCCTGAGCTAGGV
SEQ ID NO: 158	CYP2D6 G212E S	Probe	CGCGCCGAGGTCCTCCTGAGCTAGGV
SEQ ID NO: 159	CYP2D6 G212E S	Target	CTGGACCTAGCTCAGGAGGAGTGAAGGAGGAGTCTGCGCGG
SEQ ID NO: 160	CYP2D6 G212E S	Target	CTGGACCTAGCTCAGGAGGAGTGAAGGAGGAGTCTGCGCGG
SEQ ID NO: 161	CYP2D6*9 K281del S	Invader oligo	CCACCGTGGCAGCCACTCTCACCC
SEQ ID NO: 162	CYP2D6*9 K281del S	Probe	CGCGCCGAGGTTCTCCATCTCTGCCAV



# Figure 12G

	SNPName	OligoType	Sequence@ligo
SEQ ID NO: 163	CYP2D6*9 K281del S	Probe	ACGGACGCGGAGTCCATCTCTGCCAGGV
SEQ ID NO: 164	CYP2D6*9 K281del S	Target	GCCTTCTGCGAGAGATGGAGAAAGGTGAGAGTGGCTGCCACGGTGGGG
SEQ ID NO: 165	CYP2D6*9 K281del S	Target	GCCTTCTGCGAGAGATGGAGGTGAGAGTGGCTGCCACGGTGGGG
SEQ ID NO: 166	CYP2D6 R296C S	Invader oligo	GGCAGAGAACAGGTGAGTCCACCATATGCT
SEQ ID NO: 167	CYP2D6 R296C S	Probe	CGCGCCGAGGCGAGGTTCTCATCATTGAV
SEQ ID NO: 168	CYP2D6 R296C S	Probe	ACGGACGCGGAGACAGGTTCTCATCATTGAAGV
SEQ ID NO: 169	CYP2D6 R296C S	Target	GCAGCTTCAATGATGAGAACCTGCGCATAGTGGTGGCTGACCTGTCTCTGCCCGG
SEQ ID NO: 170	CYP2D6 R296C S	Target	GCAGCTTCAATGATGAGAACCTGTCATAGTGGTGGCTGACCTGTCTCTGCCCGG
SEQ ID NO: 171	CYP2D6 L421P S	Invader oligo	GCTTCACAAAGTGGCCCTGGGCATCCT
SEQ ID NO: 172	CYP2D6 L421P S	Probe	CGCGCCGAGGAGGAAGTGTTCGGGGV
SEQ ID NO: 173	CYP2D6 L421P S	Probe	ACGGACGCGGAGGGGAAGTGTTCGGGV
SEQ ID NO: 174	CYP2D6 L421P S	Target	TCCACCCCGAACACTTCTCTGGATGCCAGGGCCACTTTGTGAAGCCG
SEQ ID NO: 175	CYP2D6 L421P S	Target	TCCACCCCGAACACTTCCCGGATGCCAGGGCCACTTTGTGAAGCCG
SEQ ID NO: 176	CYP2D6 1661[GC] S	Invader oligo	AGGCCAAAGTTGCGCAAGGTGGAT
SEQ ID NO: 177	CYP2D6 1661[GC] S	Probe	ACGGACGCGGAGCAYGGAGAAAGCGCCTV
SEQ ID NO: 178	CYP2D6 1661[GC] S	Probe	CGCGCCGAGGGAYGGAGAAAGCGCCTV
SEQ ID NO: 179	CYP2D6 1661[GC] S	Target	GCAGAGGCGCTTCTCCRTGTCCACCTTGGCGCAACTTGGGCGCTGG
SEQ ID NO: 180	CYP2D6 1661[GC] S	Target	GCAGAGGCGCTTCTCCRTGTCCACCTTGGCGCAACTTGGGCGCTGG
SEQ ID NO: 181	CYP2D6 1661[GC] AS	Invader oligo	GCAGAGCAGAGGCGCTTCTCCTT
SEQ ID NO: 182	CYP2D6 1661[GC] AS	Probe	CGCGCCGAGGGTCCACCTTGGCGV
SEQ ID NO: 183	CYP2D6 1661[GC] AS	Probe	ACGGACGCGGAGCTCCACCTTGGCGV
SEQ ID NO: 184	CYP2D6 1661[GC] AS	Target	AGTTGCGCAAGGTGGACAYGGAGAAAGCGCCTCTGCTCGCGCCA
SEQ ID NO: 185	CYP2D6 1661[GC] AS	Target	AGTTGCGCAAGGTGGAGAYGGAGAAAGCGCCTCTGCTCGCGCCA
SEQ ID NO: 186	CYP2D6*8 G169X S	Invader oligo	CTTTGTGCCCTTCTGCCCATCACCCACT
SEQ ID NO: 187	CYP2D6*8 G169X S	Probe	ACGGACGCGGAGCGGAGTGGTYGGCGV
SEQ ID NO: 188	CYP2D6*8 G169X S	Probe	CGCGCCGAGGAGGAGTGGTYGGCGAV
SEQ ID NO: 189	CYP2D6*8 G169X S	Target	GCCTTCGCCCRACCACTCCGGTGGGTGATGGGCAGAAAGGCACAAAGCG

Figure 12H

	SNPName	OligoType	SequenceOligo
SEQ ID NO: 190	CYP2D6*8_G169X_S	Target	GCCTTCGCCCRACCACTCCTGTGGTGATGGGCAGAAGGGCACAAAGCG
SEQ ID NO: 191	CYP2D6*8_G169XA_S	Invader oligo	CTTTGTGCCCTTCTGCCCATCACCCACA
SEQ ID NO: 192	CYP2D6*8_G169XA_S	Probe	CGCGCCGAGGGCGGAGTGGTYGGCGV
SEQ ID NO: 193	CYP2D6*8_G169XA_S	Probe	ACGGACGCGGAGTGGAGTGGTYGGCGV
SEQ ID NO: 194	CYP2D6*8_G169XA_S	Target	CCTTCGCCRACCACTCCGGTGGTGATGGGCAGAAGGGCACAAAGCG
SEQ ID NO: 195	CYP2D6*8_G169XA_S	Target	CCTTCGCCRACCACTCCAGTGGTGATGGGCAGAAGGGCACAAAGCG
SEQ ID NO: 196	CYP2D6*8_G169XA_AS	Invader oligo	GTGCGGCTTCGCCRACCACTCCT
SEQ ID NO: 197	CYP2D6*8_G169XA_AS	Probe	ACGGACGCGGAGGGTGGTGATGGCGV
SEQ ID NO: 198	CYP2D6*8_G169XA_AS	Probe	CGCGCCGAGGAGTGGTGATGGCGV
SEQ ID NO: 199	CYP2D6*8_G169XA_AS	Target	TTCTGCCCATCACCCACCGGAGTGGTYGGCGAAGGGCGGCACAA
SEQ ID NO: 200	CYP2D6*8_G169XA_AS	Target	TTCTGCCCATCACCCACTGGAGTGGTYGGCGAAGGGCGGCACAA
SEQ ID NO: 201	CYP2D6*17_T107I_S	Invader oligo	CGCGCCCRRAAACCCAGGATCTGGT
SEQ ID NO: 202	CYP2D6*17_T107I_S	Probe	ACGGACGCGGAGGTGATGGGCACAGGV
SEQ ID NO: 203	CYP2D6*17_T107I_S	Probe	CGCGCCGAGGATGATGGGCACAGGV
SEQ ID NO: 204	CYP2D6*17_T107I_S	Target	GCCCGCCTGTGCCCATCACCCAGATCCTGGGTTTGGCCCGGTT
SEQ ID NO: 205	CYP2D6*17_T107I_S	Target	GCCCGCCTGTGCCCATCATCCAGATCCTGGGTTTGGCCCGGTT
SEQ ID NO: 206	CYP2D6*17_T107I_AS	Invader oligo	CGCCCGCCTGTGCCCATCAA
SEQ ID NO: 207	CYP2D6*17_T107I_AS	Probe	CGCGCCGAGGCCAGATCCTGGGTTV
SEQ ID NO: 208	CYP2D6*17_T107I_AS	Probe	ACGGACGCGGAGTCCAGATCCTGGGTTTV
SEQ ID NO: 209	CYP2D6*17_T107I_AS	Target	GCCRAAACCCAGGATCTGGTGATGGGCACAGGGGGGGT
SEQ ID NO: 210	CYP2D6*17_T107I_AS	Target	GCCRAAACCCAGGATCTGGTGATGGGCACAGGGGGGGT
SEQ ID NO: 211	CYP2D6_R296C_S	Invader oligo	GAACCTGAGAGCAGCTTCAATGATGAGAACCTGA
SEQ ID NO: 212	CYP2D6_R296C_S	Probe	CGCGCCGAGGGCGCMTAGTGGTGGCTV
SEQ ID NO: 213	CYP2D6_R296C_S	Probe	ACGGACGCGGAGTGCMTAGTGGTGGCTGV
SEQ ID NO: 214	CYP2D6_R296C_S	Target	AGGTCAGCCACCACCTAKGCCAGGTTCTCATCATTTGAAGCTGCTCTCAGGGTTCCC
SEQ ID NO: 215	CYP2D6_R296C_S	Target	AGGTCAGCCACCACCTAKGCCAGGTTCTCATCATTTGAAGCTGCTCTCAGGGTTCCC
SEQ ID NO: 216	CYP2D6_R296C_S	Invader oligo	GGCAGAGAACAGGTCAGCCACCCTAKGCT

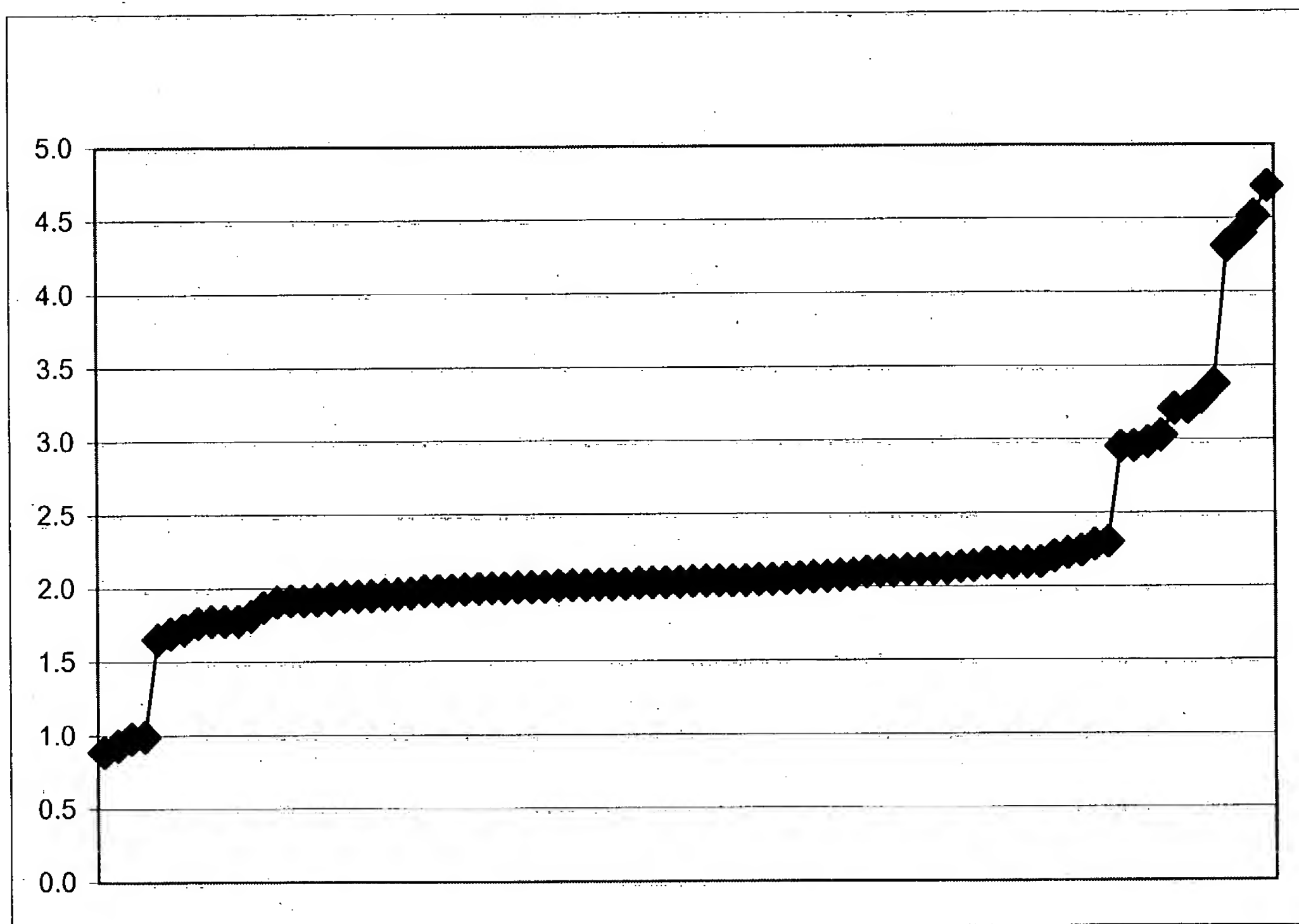
# Figure 12I

	SNPName	OligoType	SequenceOligo
SEQ ID NO: 217	CYP2D6_R296C_S	Probe	ACGGACGGCGGAGGCAGGTTCTCATCATTGAV
SEQ ID NO: 218	CYP2D6_R296C_S	Probe	CGCGCCGAGGACAGGTTCTCATCATTGAAGV
SEQ ID NO: 219	CYP2D6_R296C_S	Target	GCAGCTTCAATGATGAGAAACCTGGCMTAGTGGCTGACCTGTTCTCTGCCGG
SEQ ID NO: 220	CYP2D6_R296C_S	Target	GCAGCTTCAATGATGAGAAACCTGTGCMTAGTGGCTGACCTGTTCTCTGCCGG
SEQ ID NO: 221	CYP2D6*2B	Invader oligo	GGCAGAGAAACAGGTCAGCCACCCTAKGCT
SEQ ID NO: 222	CYP2D6*2B	Probe	ACGGACGGGAGGCAGGTTCTCATCATTGAV
SEQ ID NO: 223	CYP2D6*2B	Probe	CGCGCCGAGGACAGGTTCTCATCATTGAAGV
SEQ ID NO: 224	CYP2D6*2B	Target	GCAGCTTCAATGATGAGAAACCTGGCMTAGTGGCTGACCTGTTCTCTGCCGG
SEQ ID NO: 225	CYP2D6*2B	Target	GCAGCTTCAATGATGAGAAACCTGTGCMTAGTGGCTGACCTGTTCTCTGCCGG
SEQ ID NO: 226	CYP2D6_R296C_AS	Invader oligo	GAACCTGAGAGCAGCTTCAATGATGAGAAACCTGA
SEQ ID NO: 227	CYP2D6_R296C_AS	Probe	ACGGACGGGAGCGCMTAGTGGTGGCTV
SEQ ID NO: 228	CYP2D6_R296C_AS	Probe	CGCGCCGAGGTGCMTAGTGGTGGCTGV
SEQ ID NO: 229	CYP2D6_R296C_AS	Target	AGGTCAGCCACCACTAKGCGCAGGTTCTCATCATTGAAGCTGCTCTCAGGGTTCCC
SEQ ID NO: 230	CYP2D6_R296C_AS	Target	AGGTCAGCCACCACTAKGCGCAGGTTCTCATCATTGAAGCTGCTCTCAGGGTTCCC
SEQ ID NO: 231	CYP2D6_H94R_S	Invader oligo	CGGTCGGCSGTGCTCTCGCCGA
SEQ ID NO: 232	CYP2D6_H94R_S	Probe	ACGGACGGGAGTGGTCAACCAKCGCV
SEQ ID NO: 233	CYP2D6_H94R_S	Probe	CGCGCCGAGGGCGGTCAACCAKCGCV
SEQ ID NO: 234	CYP2D6_H94R_S	Target	CGAGGCGMTGGTGACCCACGGCGAGGACACSGCCGACCGCC
SEQ ID NO: 235	CYP2D6_H94R_S	Target	CGAGGCGMTGGTGACCCGCGGCGAGGACACSGCCGACCGCC
SEQ ID NO: 236			gcaagaaggaggtgcaggg
SEQ ID NO: 237			aaggcttgcaggcttca
SEQ ID NO: 238			gaatccgggtgcgaagtg
SEQ ID NO: 239			ctgtggtgaggtgacgagg
SEQ ID NO: 240			GCTCGGACTACGGTCATCA
SEQ ID NO: 241			ggcccccgcactgttc
SEQ ID NO: 242		FRET probe (FAM)	Y-tct-X-agg-cgg-ttt-tcc-ggc-tga-gac-ctc-ggc-gcg-hex
SEQ ID NO: 243		FRET probe (RED)	Y-tct-X-agg-cgg-ttt-tcc-ggc-tga-gac-tcc-gcg-tcc-gt-hex

Figure 12J

	SNP Name	Oligo Type	Sequence Oligo
SEQ ID NO: 244	CYP2D6*3	Invader oligo	CCCAGCTGGATGAGCTGCTAACTGAGCAT
SEQ ID NO: 245		Probe	ATGACGTGGCAGACACGAGATGACCTGGGAV
SEQ ID NO: 246		Probe	CGGCCGAGGGGATGACCTGGGAV
SEQ ID NO: 247		Target	CTGGGTCCCAGGTGCTATCCTGTGCTCAGTTAGCAGCTCATCCAGCTGGGTC
SEQ ID NO: 248		Target	GCTGGGTCCCAGGTGCTATCCTGTGCTCAGTTAGCAGCTCATCCAGCTGGGTC
SEQ ID NO: 249	CYP2D6*4	Invader oligo	CCGTTGGGCGCAAGGGCGTCA
SEQ ID NO: 250		Probe	ACGGACCGCGGAGTTGGGGTGGGAGAV
SEQ ID NO: 251		Probe	ATGACGTGGCAGACACCTGGGGTGGGAGV
SEQ ID NO: 252		Target	CGCATCTCCACCCCAAGACGCCCTTTGCCCCAACGGTC
SEQ ID NO: 253		Target	CGCATCTCCACCCCAAGACGCCCTTTGCCCCAACGGTC
SEQ ID NO: 254	alpha actin (used with 2D6*3)	Invader oligo	ccatccagggaagagtgccctgtt
SEQ ID NO: 255		Probe	acgaacgaggagaggaaacccgtgacat
SEQ ID NO: 256		Target	tttgaaatgtcacaggggttcctaacaggccactctccctggatggg
SEQ ID NO: 257	alpha actin (used with 2D6*4)	Invader oligo	aggagtagccacgctcggtaggatctcatt
SEQ ID NO: 258		Probe	CGCGCCGAGGcaggtagtcggtgagat
SEQ ID NO: 259		Target	cgggatctaccgactaccctgatgaagatcctcaccgagcggtggtactccttc
SEQ ID NO: 260	CYP2D6*5	Invader oligo	5'-CCCCGCCACCCACACTGAGCC
SEQ ID NO: 261		Probe	5'-ACGGACCGCGGAGTTACAGCACAGGTGC
SEQ ID NO: 262		FRET probe (FAM)	Y-tct-X-agg-cgg-ttt-tcc-ggc-tga-gag-tct-gcc-acg-tca-t-hex

**FIGURE 13**



**FIGURE 14**

Primer Name	Sequence	Size	Oligo TM	Amplicon Size
primer pair 1	AAG GCT TTG CAG GCT TCA	18 bases	64.3	1460 bp
primer pair 1	GCT CGG ACT ACG GTC ATC A	19 bases	65.3	
primer pair 2	TGG AAT CCG GTG TCG AAG	18 bases	63.4	942 bp
primer pair 2	GAA ATC TCT GAC GTG GAT AG	20 bases	58.8	
primer pair 3	GTA CCT CCT ATC CAC GTC A	19 bases	61.7	866 bp
primer pair 3	CAC TCC TTC TTG CCT CCT A	19 bases	62.2	
primer pair 4	GCA AGA AGG AGT GTC AGG G	19 bases	64.1	1748 bp
primer pair 4	CTG TGG TGA GGT GAC GAG G	19 bases	66.1	



FIGURE 15

SNP Name	Nucleotide position/ change	Oligo Type	Dye	Poly- morphis m	Assay Oligo Sequence
CYP2D6 S486T	4180G>C	Invader	NONE		GCCACCATGGTGTCTTGGCTTCTGGTGAT
CYP2D6 S486T	4180G>C	Probe	FAM	C	CGCGCCGAGGCCCATCCCTATGV
CYP2D6 S486T	4180G>C	Probe	RED	G	ACGGACGCGAGGCCCATCCCTATV
CYP2D6 S486T	4180G>C	Target	FAM	C	AGCTCATAGGGGATGGGTACCCAGGAAAGCAACACCATGGTGGCTG
CYP2D6 S486T	4180G>C	Target	RED	G	AGCTCATAGGGGATGGGTACCCAGGAAAGCAACACCATGGTGGCTG
CYP2D6 1846G>A	1846G>A	Invader	NONE		CCTACCCGCATCTCCACCCCAT
CYP2D6 1846G>A	1846G>A	Probe	FAM	A	CGCGCCGAGGAGACGCCCTTTTCGV
CYP2D6 1846G>A	1846G>A	Probe	RED	G	ACGGACGCGGAGGAGGCCCTTTTCV
CYP2D6 1846G>A	1846G>A	Target	FAM	A	GGGGCGAAAGGGGCGTCTTGGGGTGGGAGATCGGGTAAGGGG
CYP2D6 1846G>A	1846G>A	Target	RED	G	GGGGCGAAAGGGGCGTCTTGGGGTGGGAGATCGGGTAAGGGG
CYP2D6 H324P	2935A>C	Invader	NONE		GGGCTACGCTGCACATCCGGAC
CYP2D6 H324P	2935A>C	Probe	FAM	A	CGCGCCGAGGTAGGATCATGAGCAGV
CYP2D6 H324P	2935A>C	Probe	RED	C	ACGGACGCGGAGGTAGGATCATGAGCAGV
CYP2D6 H324P	2935A>C	Target	FAM	A	GCCTCTGCTCATGATCATCCGATCCGGATGTCAGCGTGAGCCCAT
CYP2D6 H324P	2935A>C	Target	RED	C	GCCTCTGCTCATGATCATCCGATCCGGATGTCAGCGTGAGCCCAT
CYP2D6 P34S	100C>T	Invader	NONE		GCAGTGGCAGGGGGCCCTGGTGT
CYP2D6 P34S	100C>T	Probe	RED	C	ACGGACGCGGAGGTAGCGTGCAGCV
CYP2D6 P34S	100C>T	Probe	FAM	T	CGCGCCGAGGAGTAGCGTGCAGCCV
CYP2D6 P34S	100C>T	Target	RED	C	GCTGGCTGACGCTACCCACAGGCCCCCTGCCACIGCCC
CYP2D6 P34S	100C>T	Target	FAM	T	GCTGGCTGACGCTACCCACAGGCCCCCTGCCACIGCCC
CYP2D6 883G>C	883G>C	Invader	NONE		AGGCCCTGACCCCTCCCTCTGCAT
CYP2D6 883G>C	883G>C	Probe	FAM	G	CGCGCCGAGGGTTGCGGCGCCV
CYP2D6 883G>C	883G>C	Probe	RED	C	ACGGACGCGGAGCTTGGCGGCCV
CYP2D6 883G>C	883G>C	Target	FAM	G	AAGCGGCGCCGCAACTGCAGAGGGAGGGTCAGGGCCTCT
CYP2D6 883G>C	883G>C	Target	RED	C	AAGCGGCGCCGCAAGTGCAGAGGGAGGGTCAGGGCCTCT
CYP2D6 1661G>C	1661G>C	Invader	NONE		GCGAGCAGAGCGGCTTCTCCGTT
CYP2D6 1661G>C	1661G>C	Probe	FAM	G	CGCGCCGAGGGTCCACCTTGCGCV
CYP2D6 1661G>C	1661G>C	Probe	RED	C	ACGGACGCGGAGCTCCACCTTGCGCV
CYP2D6 1661G>C	1661G>C	Target	FAM	G	AGTTGCGCAAGGTGGACACGAGAGCGCCTCTGCTCGCGC
CYP2D6 1661G>C	1661G>C	Target	RED	C	AGTTGCGCAAGGTGGACACGAGAGCGCCTCTGCTCGCGC
CYP2D6 L421P	3887T>C	Invader	NONE		GCTTCAAAAGTGGCCCTGGGCATCCT
CYP2D6 L421P	3887T>C	Probe	FAM	T	CGCGCCGAGGAGGAAGTTCGGGV
CYP2D6 L421P	3887T>C	Probe	RED	C	ACGGACGCGGAGGGGAAGTTCGGGV
CYP2D6 L421P	3887T>C	Target	FAM	T	TCCACCCCGAACACTTCTGATGCCAGGGCCACTTTGTGAAGCCG
CYP2D6 L421P	3887T>C	Target	RED	C	TCCACCCCGAACACTTCTGATGCCAGGGCCACTTTGTGAAGCCG
CYP2D6 T107I	1023C>T	Invader	NONE		CGCCCGCCTGTGCCCATCAA
CYP2D6 T107I	1023C>T	Probe	FAM	C	CGCGCCGAGGCCCATGATCCTGGGTTV
CYP2D6 T107I	1023C>T	Probe	RED	T	ACGGACGCGGAGTCCAGATCCTGGGTTTV
CYP2D6 T107I	1023C>T	Target	FAM	C	GCCCAAACCCAGGATCTGGGTGATGGGCACAGCGGGCGGT
CYP2D6 T107I	1023C>T	Target	RED	T	GCCCAAACCCAGGATCTGGGTGATGGGCACAGCGGGCGGT

**FIGURE 15**

SNP Name	Nucleotide position/ change	Oligo Type	Dye	Poly- morphis m	Assay Oligo Sequence
CYP2D6_1973[Gins]	1973[insG]	Invader	NONE		CAGGCTGCTGGACCTAGTCTCAGGAGGT
CYP2D6_1973[Gins]	1973[insG]	Probe	RED	INS	acggacgcgagaggATCGAAGGAGGAGT
CYP2D6_1973[Gins]	1973[insG]	Probe	FAM	DEL	CGCGCCGAGGACTGAAGGAGGAGTCGV
CYP2D6_1973[Gins]	1973[insG]	Target	RED	INS	CCCGACTCCTCCTTCGATCCCCCTCCTGAGCTAGGTCCAGCAGCCTGAGT
CYP2D6_1973[Gins]	1973[insG]	Target	FAM	DEL	AGCCCAGACTCCTCCTTCAGTCCCTCCTGAGCTAGGTCCAGCAGCCTGAG
CYP2D6_3259[insGT]	3259[insGT]	Invader	NONE		GCCCTACACCACITGCCGTGATTCAIGAGGC
CYP2D6_3259[insGT]	3259[insGT]	Probe	FAM	INS	CGGCGCGAGGTGTGCAGCGCTTTGV
CYP2D6_3259[insGT]	3259[insGT]	Probe	RED	DEL	ACGACGCGGAGTGACGCGCTTTGGV
CYP2D6_3259[insGT]	3259[insGT]	Target	FAM	INS	TGTCCCCAAAGCGCTGCACACCTCATGAATCACGGCAGTGGTGTAGGGCAT
CYP2D6_3259[insGT]	3259[insGT]	Target	RED	DEL	TGTCCCCAAAGCGCTGCACCTCATGAATCACGGCAGTGGTGTAGGGCAT
CYP2D6_E410K	3853G>A	Invader	NONE		CATCRGTGCTGAAGGATGAGGCCGTCTGGT
CYP2D6_E410K	3853G>A	Probe	RED	G	ACGGACGCGGAGGAGAAGCCCTTCCGV
CYP2D6_E410K	3853G>A	Probe	FAM	A	CGCGCCGAGGAAGAAGCCCTTCCGV
CYP2D6_E410K	3853G>A	Target	RED	G	GGAAGCGGAAGGGCTTCTCCAGACGGCCCTCATCCTTCAGCACYGATGAC
CYP2D6_E410K	3853G>A	Target	FAM	A	GGAAGCGGAAGGGCTTCTCCAGACGGCCCTCATCCTTCAGCACYGATGAC
CYP2D6_G42R	124G>A	Invader	NONE		GGCCCCCTGCCACTGCCCCCT
CYP2D6_G42R	124G>A	Probe	RED	G	ACGGACGCGGAGGGCTGGGCAACV
CYP2D6_G42R	124G>A	Probe	FAM	A	CGCGCCGAGGAGGCTGGGCAACCV
CYP2D6_G42R	124G>A	Target	RED	G	AGCAGGTTGCCAGCCCGGCGAGTGGCAGGGGGCCTG
CYP2D6_G42R	124G>A	Target	FAM	A	AGCAGGTTGCCAGCCCTGGGCAGTGGCAGGGGGCCTG
CYP2D6_R201H	1943G>A	Invader	NONE		CGCGCTTCGAGTACGACGACCCCTCT
CYP2D6_R201H	1943G>A	Probe	FAM	G	CGCGCCGAGGGCTTCTCCTCAGGCTGV
CYP2D6_R201H	1943G>A	Probe	RED	A	ACGGACGCGGAGACTTCTCAGGCTGCV
CYP2D6_R201H	1943G>A	Target	FAM	G	TCCAGCAGCCTGAGGAAGCGAGGGTCGTCGTACTCGAAGCGGGCGCC
CYP2D6_R201H	1943G>A	Target	RED	A	TCCAGCAGCCTGAGGAAGTGAAGGTCGTCGTACTCGAAGCGGGCGCC
CYP2D6_R440H	4042G>A	Invader	NONE		CCCTCCCCCTCCCCACAGGCCT
CYP2D6_R440H	4042G>A	Probe	FAM	G	CGCGCCGAGGGCCGTGCATGCCV
CYP2D6_R440H	4042G>A	Probe	RED	A	ACGGACGCGGAGACCGTGCATGCCTV
CYP2D6_R440H	4042G>A	Target	FAM	G	CCCGAGGCATGCACGGCGGCCTGTGGGAGGGGAGGGGC
CYP2D6_R440H	4042G>A	Target	RED	A	CCCGAGGCATGCACGGTGGCCTGTGGGAGGGGAGGGGC
CYP2D6_V11M	31G>A	Invader	NONE		AGAAGCACTGGTGCCCTGGCCT
CYP2D6_V11M	31G>A	Probe	FAM	G	CGCGCCGAGGGTGATAGTGCCATCTTCV
CYP2D6_V11M	31G>A	Probe	RED	A	ACGGACGCGGAGATGATAGTGCCATCTTCV
CYP2D6_V11M	31G>A	Target	FAM	G	GCAGGAAGATGGCCACTATCACGGCCAGGGCACCAGTGTCTTAG
CYP2D6_V11M	31G>A	Target	RED	A	GCAGGAAGATGGCCACTATCATATGCCAGGGCACCAGTGTCTTAG
CYP2D6_V338M	3183G>A	Invader	NONE		GGCCGTGTCCAACAGGAGATCGACGACT
CYP2D6_V338M	3183G>A	Probe	RED	G	ACGGACGCGGAGGTGATAGGGCAGGTGV
CYP2D6_V338M	3183G>A	Probe	FAM	A	CGCGCCGAGGATGATAGGGCAGGTGCV
CYP2D6_V338M	3183G>A	Target	RED	G	CGCCGACCTGCCCTATCACGTCGTCGATCTCCTGTGGACACGGCCTG
CYP2D6_V338M	3183G>A	Target	FAM	A	CGCCGACCTGCCCTATCATATGTCGTCGATCTCCTGTGGACACGGCCTG

FIGURE 15

SNP Name	Nucleotide position/ change	Oligo Type	Dye	Poly- morphis m	Assay/Oligo Sequence
CYP2D6 V7M	19G>A	Invader	NONE		TGGCCACTATCAYGGCCAGGGGCAA
CYP2D6 V7M	19G>A	Probe	RED	G	ACGGACCGGAGCCAGTGTCTTAGCCV
CYP2D6 V7M	19G>A	Probe	FAM	A	CGCGCCGAGGTCAGTGTCTTAGCCV
CYP2D6 V7M	19G>A	Target	RED	G	TATGGGCTAGAAAGCACTGTGCCCTGGCCRTGATAGTGCCATC
CYP2D6 V7M	19G>A	Target	FAM	A	TATGGGCTAGAAAGCACTGTATGCCCTGGCCRTGATAGTGCCATC
CYP2D6 2549A>del		Invader	NONE		GCTGGCTGGTCCCAGGTCACT
CYP2D6 2549A>del		Probe	RED	INS	ACGGACCGGAGCTGTGCTCAGTTAGCAGV
CYP2D6 2549A>del		Probe	FAM	DEL	CGCGCCGAGGCGTGTCTCAGTTAGCAGV
CYP2D6 2549A>del		Target	RED	INS	ATGAGCTGCTAACTGAGCACAGGATGACCTGGGACCCAGCCAGCCCC
CYP2D6 2549A>del		Target	FAM	DEL	ATGAGCTGCTAACTGAGCACAGGATGACCTGGGACCCAGCCAGCCCC
CYP2D6 1707T>del		Invader	NONE		CAGGGGGCTCCTCGGTACCT
CYP2D6 1707T>del		Probe	FAM	INS	CGCGCCGAGGCACTGTCTCCAGCGAV
CYP2D6 1707T>del		Probe	RED	DEL	ACGGACCGGAGGCTGTCTCCAGCGAV
CYP2D6 1707T>del		Target	FAM	INS	AGAAGTCGCTGGAGCAGTGGTGACCGAGGAGGCCCGCTGCC
CYP2D6 1707T>del		Target	RED	DEL	AGAAGTCGCTGGAGCAGGTTGACCGAGGAGGCCCGCTGCC
CYP2D6 1039C>T V3	1039C>T	Invader	NONE		CTTGCCCTTGGGAACCGCGGCCCT
CYP2D6 1039C>T V3	1039C>T	Probe	FAM	C	CGCGCCGAGGAAACCCAGGATCTGGV
CYP2D6 1039C>T V3	1039C>T	Probe	RED	T	ACGGACCGGAGAAACCCAGGATCTGGV
CYP2D6 1039C>T V3	1039C>T	Target	FAM	C	TCACCCAGATCCTGGGTTTCGGCCCGCTTCCCAAGGCAAGCA
CYP2D6 1039C>T V3	1039C>T	Target	RED	T	TCACCCAGATCCTGGGTTTGGCCCGCTTCCCAAGGCAAGCA
CYP2D6 R296C V4	2850C>T	Invader	NONE		GGCAGAGAACAGGTCAGCCACCACTATGCT
CYP2D6 R296C V4	2850C>T	Probe	RED	C	ACGGACCGGAGGCAAGTGTCTCATCTGAAGV
CYP2D6 R296C V4	2850C>T	Probe	FAM	T	CGCGCCGAGGACAGGTTCTCATCTGAAGV
CYP2D6 R296C V4	2850C>T	Target	RED	C	GCAGCTTCAATGATGAGAACCTGCGCATAGTGGCTGACCTGTCTGCCCCG
CYP2D6 R296C V4	2850C>T	Target	FAM	T	GCAGCTTCAATGATGAGAACCTGTGCATAGTGGTGGCTGACCTGTCTGCCCCG
CYP2D6*8 G169X 1/3	1758G>T	Invader	NONE		TGTGCCGCCCTTCGCCRACCACTCv
CYP2D6*8 G169X 1/3	1758G>T	Probe	FAM	G	CGCGCCGAGGGTGGTGTATGGCV
CYP2D6*8 G169X 1/3	1758G>T	Probe	RED	T	ACGGACCGGAGTGTGGTGTATGGCV
CYP2D6*8 G169X 1/3	1758G>T	Target	FAM	G	TTCTGCCCATCACCCACCrGAGTGTGTGGCGAAGGGGCACAAA
CYP2D6*8 G169X 1/3	1758G>T	Target	RED	T	TTCTGCCCATCACCCACCrGAGTGTGTGGCGAAGGGGCACAAA
CYP2D6*14 G169R 1/3	1758G>A	Invader	NONE		TGTGCCGCCCTTCGCCRACCACTCv
CYP2D6*14 G169R 1/3	1758G>A	Probe	FAM	G	CGCGCCGAGGGTGGTGTATGGCV
CYP2D6*14 G169R 1/3	1758G>A	Probe	RED	A	ACGGACCGGAGAGTGGTGTATGGCV
CYP2D6*14 G169R 1/3	1758G>A	Target	FAM	G	TTCTGCCCATCACCCACCrGAGTGTGTGGCGAAGGGGCACAAA
CYP2D6*14 G169R 1/3	1758G>A	Target	RED	A	TTCTGCCCATCACCCACCrGAGTGTGTGGCGAAGGGGCACAAA
CYP2D6 H94R AS	984A>G	Invader	NONE		TGCGGAGGGMTGGTGACCT
CYP2D6 H94R AS	984A>G	Probe	FAM	A	CGCGCCGAGGACGGCGGAGGACACv
CYP2D6 H94R AS	984A>G	Probe	RED	G	ACGGACCGGAGGCGGCGGAGGACACv
CYP2D6 H94R AS	984A>G	Target	FAM	A	TCGGCSGTGTCTCGCCGTGGTGTACCAKCGCCTCGCGCACG
CYP2D6 H94R AS	984A>G	Target	RED	G	TCGGCSGTGTCTCGCCGTGGTGTACCAKCGCCTCGCGCACG



FIGURE 15

SNP Name	Nucleotide position/ change	Oligo Type	Dye	Poly- morphis m	Assay/Oligo Sequence
CYP2D6 2539-2542[delAACT]	2539-2542[delAACT]	Invader	NONE		GCTGGGTCCCAGGTATCCGTGCTT
CYP2D6 2539-2542[delAACT]	2539-2542[delAACT]	Invader	NONE		GCTGGGTCCCAGGTATCCGTGCTT
CYP2D6 2539-2542[delAACT]	2539-2542[delAACT]	Probe	FAM	DEL	cgggccgaggCAGCAGCTCATCCAG
CYP2D6 2539-2542[delAACT]	2539-2542[delAACT]	Probe	RED	INS	acggacgagcagagcagttAGCAGCTCATCC
CYP2D6 2539-2542[delAACT]	2539-2542[delAACT]	Target	FAM	DEL	ACCCAGCTGGATGAGCTGCTGAGCACGGATGACCTGGGACCCAGCCCC
CYP2D6 2539-2542[delAACT]	2539-2542[delAACT]	Target	FAM	DEL	ACCCAGCTGGATGAGCTGCTGAGCACAGGATGACCTGGGACCCAGCCCC
CYP2D6 2539-2542[delAACT]	2539-2542[delAACT]	Target	RED	INS	ACCCAGCTGGATGAGCTGCTGAGCACAGGATGACCTGGGACCCAGCCCC
CYP2D6 2539-2542[delAACT]	2539-2542[delAACT]	Target	RED	INS	ACCCAGCTGGATGAGCTGCTGAGCACAGGATGACCTGGGACCCAGCCCC
CYP2D6 2613-2615delAGA	2613-2615delAGA	Invader	NONE		CCACCGTGGCAGCCACTCTCACCC
CYP2D6 2613-2615delAGA	2613-2615delAGA	Probe	FAM	INS	CGGCCGAGGTTCTCCATCTCTGCCAV
CYP2D6 2613-2615delAGA	2613-2615delAGA	Probe	RED	DEL	ACGGACGGGAGTCCATCTCTGCCAGGV
CYP2D6 2613-2615delAGA	2613-2615delAGA	Target	FAM	INS	GCCTTCCITGGCAGAGATGGAGAAAGGTGAGAGTGGCTGCCACGGTGGGG
CYP2D6 2613-2615delAGA	2613-2615delAGA	Target	RED	DEL	GCCTTCCITGGCAGAGATGGAGGTGAGAGTGGCTGCCACGGTGGGG
CYP2D6 172-174FRPrep(a) is	1863insTTTTGGCCC	Invader	NONE		CCCCARGACGCCCTTTTCGCCCT
CYP2D6 172-174FRPrep(a) is	1863insTTTTGGCCC	Probe	FAM	INS	CGGCCGAGGCTTTTCGCCCTTTTCGV
CYP2D6 172-174FRPrep(a) is	1863insTTTTGGCCC	Probe	RED	DEL	ACGGACGGGAGCAACGGTCTCTTGACV
CYP2D6 172-174FRPrep(a) is	1863insTTTTGGCCC	Target	FAM	INS	CTTTGTCCAAGAGACCCGTTGGGGCGAAAGGGGGCGAAAGGGCGTCTGTGG
CYP2D6 172-174FRPrep(a) is	1863insTTTTGGCCC	Target	RED	DEL	CTTTGTCCAAGAGACCCGTTGGGGCGAAAGGGGGCGTCTGTGGGGT
CYP2D6 221C>A as		Invader	NONE		GGAGGGGGGCGCAGAGGTCTGAGGT
CYP2D6 221C>A as		Probe	RED	C	ACGGACGGGAGGCTCCGCTACAGCAAGCAV
CYP2D6 221C>A as		Probe	FAM	A	CGGCCGAGGATCCGCGACCAAGAAV
CYP2D6 221C>A as		Target	RED	C	ATGTTTCTTCTGCTAGGGTGGGAGGCTCAGSAGCTCTGCGGCGCTCCAG
CYP2D6 221C>A as		Target	FAM	A	ATGTTTCTTCTGCTAGGGTGGGATCTCAGSAGCTCTGCGGCGCTCCAG
CYP2D6 221C>A s		Invader	NONE		CCACCATCCATGTTTCTGCTGTTGGGSAC
CYP2D6 221C>A s		Probe	FAM	C	CGGCCGAGGGGCTCAGCACTCTGV
CYP2D6 221C>A s		Probe	RED	A	ACGGACGGGAGTCTCTCAGCACTCTGV
CYP2D6 221C>A s		Target	FAM	C	GGGGCAGAGGTCTGAGGCTSCCCYACCAAGCAAAACATGGATGGTGGGTG
CYP2D6 221C>A s		Target	RED	A	GGGGCAGAGGTCTGAGGATSCCCYACCAAGCAAAACATGGATGGTGGGTG
CYP2D6 223C>G as		Invader	NONE		GGAGGGGGCGCAGAGGTCTGAGGTTT
CYP2D6 223C>G as		Probe	RED	C	ACGGACGGGAGGCGCCCTACCAAGCAAAacV
CYP2D6 223C>G as		Probe	FAM	G	CGGCCGAGGGGCGCCCTACCAAGCAAGCV
CYP2D6 223C>G as		Target	RED	C	ATGTTTCTTCTGTTGGTGGGAGCCTCAGCACTCTGCGGCGCTCCAG
CYP2D6 223C>G as		Target	FAM	G	ATGTTTCTTCTGTTGGTGGGAGCCTCAGCACTCTGCGGCGCTCCAG
CYP2D6 223C>G s		Invader (mutant)	NONE		CCACCATGTTTCTGCTGTTGGTGGGGT
CYP2D6 223C>G s		Invader (wild-type)	NONE		ACCCACCATCCATGTTTCTGCTTCTGTTGGGT
CYP2D6 223C>G s		Probe	RED	C	ACGGACGGGAGGAGCTCAGCACTCTV
CYP2D6 223C>G s		Probe	FAM	G	CGGCCGAGGCACTCTCAGCACTCTGV
CYP2D6 223C>G s		Target	RED	C	GGGGCAGAGGTCTGAGGCTTCCCAACCAAGCAAAACATGGATGGTGGGTGA

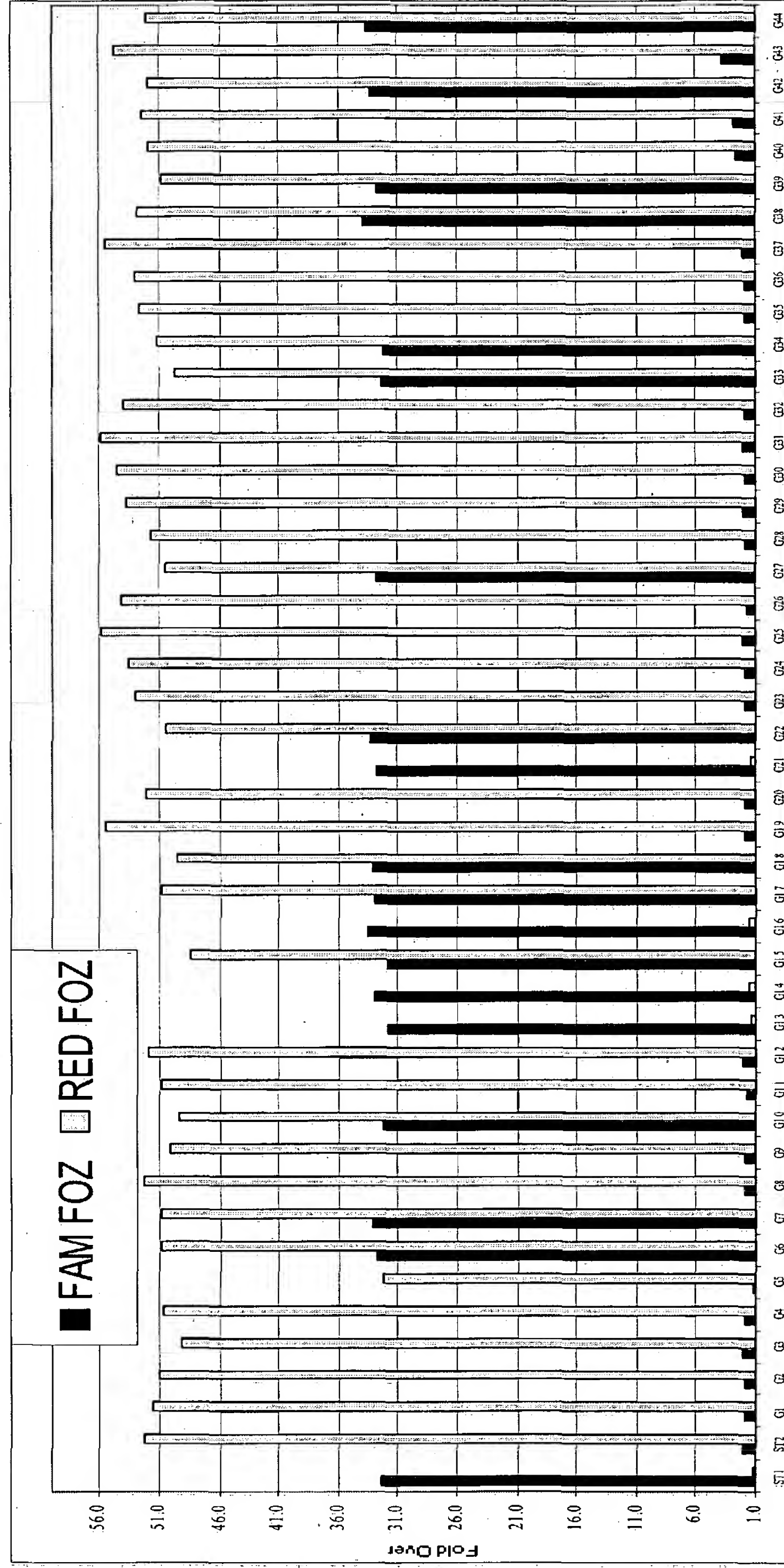


FIGURE 15

SNP Name	Nucleotide position/ change	Oligo Type	Dye	Poly- morphis m	Assay Oligo Sequence
CYP2D6 223C>G s		Target	FAM	G	GGCGGCAGAGGTcCTGAGGaTGCCCCcACCAGAAAGCAAAACATGGATGGTGGGTGA
Copy Number Designs	Gene	Oligo	Sequence		
E	2D6	2D6 Invader	CCGCGGCCACCCACACTGAGCC		
E	Alpha Actin	Alpha Actin Invader	AGGAGTAGCCACGCTCGGTGAGGATCTTCATT		
E	2D6	Probe Arm3 2D6	ACGGACGCGGAGTTACAGCACAGGTGC		
E	Alpha Actin	Probe Arm1 Alpha Actin	CGCGCCGAGGCAGGTAGTCGGTGAGATC		
E	2D6	Synthetic Target Alpha Actin	GGACCGCACCTGTGCTGTAAgCTCAGTGTGGTGGCGCGGGGC		
E	Alpha Actin	Synthetic Target 2D6	CGCGATCTCACCCGACTACCTGAATGAAGATCCTCACCAGCGTGGCTACTCCTTC		

FRET SEQUENCES  
SEQ ID 242 (FRET probe FAM): Y-tct-X-agc-cgg-ttt-tcc-ggc-tga-gac-ctc-ggc-gcg-hex  
SEQ ID 243 (FRET probe RED): Y-tct-X-agc-cgg-ttt-tcc-ggc-tga-gac-tcc-gcg-tcc-gt-hex

FIGURE 16A





**FIGURE 16B**

SAMPLE NUMBER	ALLELE RATIO	GENOTYPE		
1	26	R		
2	24.74	R		
3	23.71	R		
4	26.26	R		
5	27.43	R		
6	1.55		H	
7	1.54		H	
8	25.89	R		
9	24.82	R		
10	1.53		H	
11	28.7	R		
12	24.53	R		
13	0.05			F
14	0.05			F
15	1.52		H	
16	0.05			F
17	1.54		H	
18	1.49		H	
19	27.55	R		
20	27.81	R		
21	0.04			F
22	1.52		H	
23	26.5	R		
24	26.41	R		
25	26.62	R		
26	29.62	R		
27	1.54		H	
28	27	R		
29	25.76	R		
30	26.9	R		
31	26.42	R		
32	28.02	R		
33	1.53		H	
34	1.59		H	
35	27.49	R		
36	26.16	R		
37	26.28	R		
38	1.56		H	
39	1.55		H	
40	19.14	R		
41	18.48	R		
42	1.56			
43	14.51	R		
44	1.54		H	

**FIGURE 17**

<b>Allele</b>	<b>Signature SNP</b>
<b>*3</b>	2549A>del
<b>*4</b>	1846G>A
<b>*5</b>	CYP2D6 deleted
<b>*6</b>	1707T>del
<b>*7</b>	2935A>C
<b>*8</b>	1758G>T

**FIGURE 18**

<b>Allele</b>	<b>Secondary Signature SNPs</b>
<b>*2</b>	18 SNPs
<b>*10</b>	4 SNPs
<b>*17</b>	2 SNPs

FIGURE 19

GENE_COPY_NUMBER	G19A	G31A	C100	G124	G883	A984	C102	T170	G175	G184	INS18	G194	INS19	AACT	A254	INS25 73 or C221	AGA2 613D EL	C285 0T	A293 5C	G318 3A	INS32 59GT	G385 3A	G404 2A	G418 0C	COP_Y_NU_MBE R_31 G	COP_Y_NU_MBE R_10 0T	COP_Y_NU_MBE R_41 80G	GENOTYPE	Caucasian Genotype Frequency
2	w	w	w	w	w	w	w	w	w	w	w	w	w	w	w	w	w	w	w	w	w	w	w	w				*1*1	0.132
2	w	w	het	w	w	w	w	w	w	w	w	w	w	w	w	w	w	w	w	w	w	w	w	het				*1*10	0.011
2	w	w	w	w	het	w	w	w	w	w	w	w	w	w	w	w	w	het	w	w	w	w	w	het				*1*11	<0.001
2	w	w	w	het	w	w	w	w	w	w	w	w	w	w	w	w	w	het	w	w	w	w	w	het				*1*12	<0.001
2	w	w	het	w	w	w	w	w	het	w	w	w	w	w	w	w	w	het	w	w	w	w	w	het				*1*14	<0.001
2	w	w	w	w	w	w	w	w	het	w	w	w	w	w	w	w	w	het	w	w	w	w	w	het				*1*14	<0.001
2	w	w	w	w	w	w	w	w	w	w	w	w	w	w	w	w	w	het	w	w	w	w	w	het				*1*17	0.002
2	w	w	w	w	w	w	w	w	w	w	w	w	w	het	w	w	w	het	w	w	w	w	w	het				*1*19	<0.001
3	w	w	w	w	w	w	w	w	w	w	w	w	w	w	w	w	w	w	w	w	w	w	w	w	3	0	0	*1*1X2	0.004
4	w	w	w	w	w	w	w	w	w	w	w	w	w	w	w	w	w	w	w	w	w	w	w	w	4	0	0	*1*1X3	0.004
2	w	w	w	w	w	w	w	w	w	w	w	w	w	w	w	w	w	het	w	w	w	w	w	het				*1*2	0.236
2	w	w	w	w	w	w	w	w	w	w	w	w	het	w	w	w	w	het	w	w	w	w	w	het				*1*20	<0.001
2	w	w	w	w	w	w	w	w	w	w	w	w	w	w	w	het	w	het	w	w	w	w	w	het				*1*21	<0.001
2	het	w	w	w	w	w	w	w	w	w	w	w	w	w	w	w	w	het	w	w	w	w	w	het				*1*28	<0.001
2	w	w	w	w	w	w	w	w	w	w	w	w	w	w	w	w	w	het	w	w	w	w	w	het				*1*29	0.002
3	w	w	w	w	w	w	w	w	w	w	w	w	w	w	w	w	w	het	w	w	w	w	w	het				*1*2X2	0.009
4	w	w	w	w	w	w	w	w	w	w	w	w	w	w	w	w	w	het	w	w	w	w	w	het				*1*2X3	0.009
2	w	w	w	w	w	w	w	w	w	w	w	w	w	w	het	w	w	w	w	w	w	w	w	w				*1*3	0.015
2	w	w	w	w	w	w	w	w	w	w	w	w	w	w	w	w	w	het	w	w	w	w	w	het				*1*31	<0.001
2	w	het	w	w	w	w	w	w	w	w	w	w	w	w	w	w	w	het	w	w	w	w	w	het				*1*35	<0.001
3	w	het	w	w	w	w	w	w	w	w	w	w	w	w	w	w	w	het	w	w	w	w	w	het				*1*35X2	<0.001
2	w	w	het	w	w	w	w	w	w	w	w	w	w	w	w	w	w	w	w	w	w	w	w	het				*1*37	<0.001
2	w	w	het	w	w	w	w	w	w	w	w	w	w	w	w	w	w	w	w	w	w	w	w	het				*1*4	0.151
2	w	w	w	w	w	w	w	w	w	w	w	w	w	w	w	w	w	w	w	w	w	w	w	het				*1*4	0.151
2	w	w	w	w	w	w	w	w	w	w	w	w	w	w	w	w	w	het	w	w	w	w	w	het				*1*42	<0.001
2	w	w	het	w	w	w	w	w	w	w	w	w	w	w	w	w	w	w	w	w	w	w	w	w				*1*4J	0.151
3	w	w	het	w	w	w	w	w	w	w	w	w	w	w	w	w	w	het	w	w	w	w	w	w				*1*4JX2	0.001
2	w	w	het	w	w	w	w	w	w	w	w	w	w	w	w	w	w	het	w	w	w	w	w	het				*1*4K	0.151
3	w	w	het	w	w	w	w	w	w	w	w	w	w	w	w	w	w	het	w	w	w	w	w	het				*1*4KX2	0.001
3	w	w	het	w	w	w	w	w	w	w	w	w	w	w	w	w	w	w	w	w	w	w	w	het				*1*4X2	0.001
3	w	w	het	w	w	w	w	w	w	w	w	w	w	w	w	w	w	w	w	w	w	w	w	het				*1*4X2	0.001
1	w	w	w	w	w	w	w	w	w	w	w	w	w	w	w	w	w	w	w	w	w	w	w	w				*1*5	0.015
2	w	w	w	w	w	w	w	w	w	w	w	w	w	w	w	w	w	w	w	w	w	w	w	het				*1*6	0.007
2	w	w	w	w	w	w	w	w	w	w	w	w	w	w	w	w	w	w	w	w	w	w	w	w				*1*6	0.007
2	w	w	w	w	w	w	w	w	w	w	w	w	w	w	w	w	w	w	w	w	w	w	w	w				*1*7	0.001
2	w	w	w	w	w	w	w	w	w	w	w	w	w	w	w	w	w	het	w	w	w	w	w	het				*1*8	<0.001
2	w	w	w	w	w	w	w	w	w	w	w	w	w	w	w	w	het	w	w	w	w	w	w	w				*1*9	0.013
2	w	w	m	w	w	w	w	w	w	w	w	w	w	w	w	w	w	w	w	w	w	w	w	m				*10*10	<0.001
2	w	w	het	w	het	w	w	w	w	w	w	w	w	w	w	w	w	het	w	w	w	w	w	m				*10*11	<0.001
2	w	w	het	het	w	w	w	w	w	w	w	w	w	w	w	w	w	het	w	w	w	w	w	m				*10*12	<0.001

## FIGURE 19

[illegible]

## FIGURE 19

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## FIGURE 19

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## FIGURE 19

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## FIGURE 19

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**FIGURE 19**

[illegible]

## FIGURE 19

[illegible]



**FIGURE 19**

[illegible]

## FIGURE 19

[illegible]

FIGURE 19

3	w	w	het	w	w	het	w	w	w	w	w	w	w	w	het	w	w	w	w	w	w	w	w	w	het	*4JX2/*29	<0.001		
3	w	w	het	w	w	het	w	w	w	w	w	w	w	w	het	w	w	w	w	w	w	w	w	w	het	*4JX2/*31	<0.001		
3	w	het	het	w	w	het	w	w	w	w	w	w	w	w	het	w	w	w	w	w	w	w	w	het	2	1	*4JX2/*35	<0.001	
4	w	het	het	w	w	het	w	w	w	w	w	w	w	w	het	w	w	w	w	w	w	w	w	het	2	2	*4JX2/*35X2	<0.001	
3	w	w	m	w	w	het	w	w	w	w	w	w	w	w	het	w	w	w	w	w	w	w	w	het			*4JX2/*37	<0.001	
3	w	w	het	w	w	het	w	w	w	w	w	w	w	w	het	w	w	w	w	w	w	w	w	het			*4JX2/*42	<0.001	
4	w	w	m	w	w	m	w	w	w	w	w	w	w	w	m	w	w	w	w	w	w	w	w	w	4	4	0	*4JX2/*4JX2	<0.001
4	w	w	m	w	w	het	w	w	w	w	w	w	w	w	het	w	w	w	w	w	w	w	w	het	4	2	2	*4JX2/*4KX2	<0.001
2	w	w	m	w	w	m	w	w	w	w	w	w	w	w	m	w	w	w	w	w	w	w	w	w				*4JX2/*5	<0.001
3	w	w	het	w	w	het	w	w	w	w	w	w	w	w	het	w	w	w	w	w	w	w	w	w				*4JX2/*6	<0.001
3	w	w	het	w	w	het	w	w	w	w	w	w	w	w	het	w	w	w	w	w	w	w	w	het				*4JX2/*6	<0.001
3	w	w	het	w	w	het	w	w	w	w	w	w	w	w	het	w	w	w	w	w	w	w	w	w				*4JX2/*7	<0.001
3	w	w	het	w	w	het	w	w	w	w	w	w	w	w	het	w	w	w	w	w	w	w	w	het				*4JX2/*8	<0.001
3	w	w	het	w	w	het	w	w	w	w	w	w	w	w	het	w	w	w	w	w	w	w	w	w				*4JX2/*9	<0.001
2	w	w	m	w	w	w	w	w	w	w	w	w	w	w	het	w	w	w	w	w	w	w	w	w				*4K/*10	0.006
2	w	w	het	w	w	het	w	w	w	w	w	w	w	w	w	het	w	w	w	w	w	w	w	w				*4K/*11	<0.001
2	w	w	het	w	w	het	w	w	w	w	w	w	w	w	w	w	w	w	w	w	w	w	w	w				*4K/*12	<0.001
2	w	w	het	w	w	w	w	w	w	w	w	w	w	w	w	w	w	w	w	w	w	w	w	w				*4K/*14	<0.001
2	w	w	het	w	w	w	w	w	w	w	w	w	w	w	w	w	w	w	w	w	w	w	w	w				*4K/*17	0.001
2	w	w	het	w	w	w	w	w	w	w	w	w	w	w	w	w	w	w	w	w	w	w	w	w				*4K/*19	<0.001
2	w	w	het	w	w	w	w	w	w	w	w	w	w	w	w	w	w	w	w	w	w	w	w	w				*4K/*20	<0.001
2	w	w	het	w	w	w	w	w	w	w	w	w	w	w	w	w	w	w	w	w	w	w	w	w				*4K/*21	<0.001
3	w	het	het	w	w	w	w	w	w	w	w	w	w	w	w	w	w	w	w	w	w	w	w	m	1	3		*4K/*35X2	<0.001
2	w	w	m	w	w	w	w	w	w	w	w	w	w	w	het	w	w	w	w	w	w	w	w	m				*4K/*37	<0.001
2	w	w	het	w	w	w	w	w	w	w	w	w	w	w	w	w	w	w	w	w	w	w	w	m				*4K/*42	<0.001
3	w	w	m	w	w	het	w	w	w	w	w	w	w	w	het	w	w	w	w	w	w	w	w	het	3	3	1	*4K/*4JX2	<0.001
2	w	w	m	w	w	w	w	w	w	w	w	w	w	w	w	w	w	w	w	w	w	w	w	m				*4K/*4K	0.043
3	w	w	m	w	w	w	w	w	w	w	w	w	w	w	w	w	w	w	w	w	w	w	w	m	3	3	3	*4K/*4KX2	<0.001
3	w	w	m	w	w	w	w	w	w	w	w	w	w	w	w	w	w	w	w	w	w	w	m	3	3	3	*4K/*4X2	<0.001	
3	w	w	m	w	w	w	w	w	w	w	w	w	w	w	w	w	w	w	w	w	w	w	m	3	3	3	*4K/*4X2	<0.001	
1	w	w	m	w	w	het	w	w	w	w	w	w	w	w	het	w	w	w	w	w	w	w	w	m				*4K/*5	0.008
2	w	w	het	w	w	w	w	w	w	w	w	w	w	w	het	w	w	w	w	w	w	w	w	het				*4K/*6	0.004
2	w	w	het	w	w	w	w	w	w	w	w	w	w	w	het	w	w	w	w	w	w	w	w	m				*4K/*6	0.004
2	w	w	het	w	w	w	w	w	w	w	w	w	w	w	het	w	w	w	w	w	w	w	w	het				*4K/*7	<0.001
2	w	w	het	w	w	w	w	w	w	w	w	w	w	w	het	w	w	w	w	w	w	w	w	m				*4K/*8	<0.001
2	w	w	het	w	w	w	w	w	w	w	w	w	w	w	het	w	w	w	w	w	w	w	w	het				*4K/*9	0.007
3	w	w	m	w	w	w	w	w	w	w	w	w	w	w	het	w	w	w	w	w	w	w	w	m				*4KX2/*10	<0.001
3	w	w	het	w	w	het	w	w	w	w	w	w	w	w	w	w	w	w	w	w	w	w	w	m				*4KX2/*11	<0.001
3	w	w	het	w	w	w	w	w	w	w	w	w	w	w	w	w	w	w	w	w	w	w	w	m				*4KX2/*12	<0.001
3	w	w	het	w	w	w	w	w	w	w	w	w	w	w	w	w	w	w	w	w	w	w	w	m				*4KX2/*14	<0.001
3	w	w	m	w	w	w	w	w	w	w	w	w	w	w	w	w	w	w	w	w	w	w	w	m				*4KX2/*14	<0.001
3	w	w	het	w	w	w	w	w	w	w	w	w	w	w	w	w	w	w	w	w	w	w	w	m				*4KX2/*17	<0.001



## FIGURE 19

3	w	w	het	w	w	w	w	w	w	w	w	w	w	w	w	w	w	w	w	w	w	w	w	w	*4KX2*19	<0.001	
3	w	w	het	w	w	w	w	w	w	w	w	w	w	w	w	w	w	w	w	w	w	w	w	w	*4KX2*20	<0.001	
3	w	w	het	w	w	w	w	w	w	w	w	w	w	w	w	w	w	w	w	w	w	w	w	w	*4KX2*21	<0.001	
3	het	w	het	w	w	w	w	w	w	w	w	w	w	w	w	w	w	w	w	w	w	w	w	w	*4KX2*28	<0.001	
3	w	w	het	w	w	w	w	w	w	w	w	w	w	w	w	w	w	w	w	w	w	w	w	w	*4KX2*29	<0.001	
3	w	w	het	w	w	w	w	w	w	w	w	w	w	w	w	w	w	w	w	w	w	w	w	w	*4KX2*31	<0.001	
3	w	het	het	w	w	w	w	w	w	w	w	w	w	w	w	w	w	w	w	w	w	w	w	2	3	*4KX2*35	<0.001
4	w	het	het	w	w	w	w	w	w	w	w	w	w	w	w	w	w	w	w	w	w	w	2	2	4	*4KX2*35X2	<0.001
3	w	w	m	w	w	w	w	w	w	w	w	w	w	w	w	w	w	w	w	w	w	w				*4KX2*37	<0.001
3	w	w	het	w	w	w	w	w	w	w	w	w	w	w	w	w	w	w	w	w	w	w				*4KX2*42	<0.001
4	w	w	m	w	w	w	w	w	w	w	w	w	w	w	w	w	w	w	w	w	w	4	4	4		*4KX2*4KX2	<0.001
2	w	w	m	w	w	w	w	w	w	w	w	w	w	w	w	w	w	w	w	w	w					*4KX2*5	<0.001
3	w	w	het	w	w	w	w	w	w	w	w	w	w	w	w	w	w	w	w	w	w	het				*4KX2*6	<0.001
3	w	w	het	w	w	w	w	w	w	w	w	w	w	w	w	w	w	w	w	w	w	m				*4KX2*6	<0.001
3	w	w	het	w	w	w	w	w	w	w	w	w	w	w	w	w	w	w	w	w	w	het				*4KX2*7	<0.001
3	w	w	het	w	w	w	w	w	w	w	w	w	w	w	w	w	w	w	w	w	w	m				*4KX2*8	<0.001
3	w	w	het	w	w	w	w	w	w	w	w	w	w	w	w	w	w	w	w	w	w	het				*4KX2*9	<0.001
3	w	w	m	w	w	w	w	w	w	w	w	w	w	w	w	w	w	w	w	w	w	m				*4X2*10	<0.001
3	w	w	m	w	w	w	w	w	w	w	w	w	w	w	w	w	w	w	w	w	w	m				*4X2*10	<0.001
3	w	w	het	w	w	het	w	w	w	w	w	w	w	w	w	w	w	w	w	w	w	m				*4X2*11	<0.001
3	w	w	het	w	w	het	w	w	w	w	w	w	w	w	w	w	w	w	w	w	w	m				*4X2*11	<0.001
3	w	w	het	w	w	het	w	w	w	w	w	w	w	w	w	w	w	w	w	w	w	m				*4X2*12	<0.001
3	w	w	het	w	w	het	w	w	w	w	w	w	w	w	w	w	w	w	w	w	w	m				*4X2*12	<0.001
3	w	w	het	w	w	w	w	w	w	w	w	w	w	w	w	w	w	w	w	w	w	m				*4X2*14	<0.001
3	w	w	m	w	w	w	w	w	w	w	w	w	w	w	w	w	w	w	w	w	w	m				*4X2*14	<0.001
3	w	w	het	w	w	het	w	w	w	w	w	w	w	w	w	w	w	w	w	w	w	m				*4X2*14	<0.001
3	w	w																									

## FIGURE 19

[illegible]

**FIGURE 19**

[illegible]

## FIGURE 19

[illegible]



**FIGURE 20**

